



Illinois Department of Transportation

To: Anthony J. Quigley Attn: John Baczek
From: Jack A. Elston By: Michael Brand *MDB*
Subject: Pavement Design Approval
Date: August 23, 2019

Route: I-90/94 Job No.: C-91-310 & 311-15
Section: 2015-018R & 019R Contract No.: 62A76 & 62A77
County: Cook Target Letting: April 2020
Limits: at I-290 (Circle Interchange)

We have reviewed the pavement design for the above referenced projects which were submitted on August 7, 2019. The scope of these reconstruction projects is to provide new I-90/94 mainline lanes, NB C-D Road, SB Access Road, I-90/94 at I290 Interchange Ramps, I-90/94 Ramps at various streets, Accident Investigation Site, IDOT Maintenance Lot, and SB Mainline Pavement Widening at the south project limits.

We concur with the District's determination this is a "special design" due to the volume of traffic, the need for ramp pavement to match mainline, and the need for the widening to match existing; and as such, a life cycle cost analysis is not required.

In summary, the approved pavement designs are as follows:

I-90/94 Mainline Lanes

12.5" CRC Pavement with tied PCC Shoulders
4" HMA Stabilized Subbase
12" Aggregate Subgrade Improvement

I-90/94 at I-290 Ramps (NW/SE/SW/ES/EN/WS/WN);
NB CD Road; SB Access Road

11" PCC Pavement with tied PCC Shoulders
4" HMA Stabilized Subbase
12" Aggregate Subgrade Improvement

I-90/94 Ramp at Lake St

9.25" PCC Pavement with tied PCC Shoulders
4" HMA Stabilized Subbase
12" Aggregate Subgrade Improvement

1-90/94 Ramp at Randolph St/Washington/Blvd/Madison St/ Adams St/
Jackson Blvd/Roosevelt Rd

9" PCC Pavement with tied PCC Shoulders
4" HMA Stabilized Subbase
12" Aggregate Subgrade Improvement

1-90/94 Ramp at Taylor St

9.75" PCC Pavement with tied PCC Shoulders
4" HMA Stabilized Subbase
12" Aggregate Subgrade Improvement

IDOT Maintenance Lot/Accident Investigation Site

12.5" PCC Pavement with tied PCC Shoulders
4" HMA Stabilized Subbase
12" Aggregate Subgrade Improvement

Southbound 1-90/94 Mainline Lanes

17" Composite Pavement
 1.75" Polymerized HMA Surface Course
 2.25" Polymerized HMA Binder Course
 13" PCC Base Course Widening
4" HMA Stabilized Subbase
12" Aggregate Subgrade Improvement

If you have any questions, please contact Mike Brand at (217) 782-7651.



Illinois Department of Transportation

Memorandum

To: Jack Elston

Attn: Michael Brand

From: Jose A. Dominguez

By: Ojas Patel

Subject: Pavement Analysis*

Date: August 7, 2019

*Route: Interstate Route 90/94

County: Cook

Limits: at I-290 (Circle Interchange)

Contract No.: 62A76 & 62A77

Section: 2015-018R & 019R

Job No.: C-91-310 & 311-15

Current target: April 2020

We have completed the pavement analysis for the above captioned location. Review by the Central Office is required since the total pavement area for reconstruction exceeds 4,750 Square Yards. The following is the scope of the project:

Reconstruction to provide new I-90/94 Mainline Lanes, NB C-D Road, SB Access Road, I-90/94 at I-290 Interchange Ramps, I-90/94 at Various Streets Ramps, Accident Investigation Site, IDOT Maintenance Lot, and SB Mainline pavement widening at the south project limits.

A 20-year pavement analysis was performed on the above segments. This contract is part of an overall reconstruction of the I-90/94 at I-290 interchange. Interstate 90/94 Mainline lanes will be classified as a "Special Design" as the Traffic Factor exceeds 60 and as such, is not subject to a Life Cycle Cost Analysis. The widening of SB I-90/94 at the south project limits will match the existing pavement per BDE Figure 54-1.A as it is a short segment. In addition, per Section 54-1.06 of the BDE Manual, all ramps and the CD Road are recommended to match the mainline pavement type. It is recommended that the Accident Investigation Site and the IDOT Maintenance Lot be the same thickness as the mainline shoulders as they are expected to serve IDOT Maintenance and Emergency Traffic Patrol vehicles. The recommended pavement design is:

I-90/94 Mainline Lanes

Reconstruction

PCC Shoulder (Tied)¹³

12 ½" Continuously Reinforced Concrete Pavement¹

4" HMA Stabilized Subbase²

12" Aggregate Subgrade Improvement^{11, 12}

M. Addis
August 7, 2019
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**I-90/94 at I-290 Ramps (NW/SE/SW/ES/EN/WS/WN); NB CD Road;
SB Access Road**

Reconstruction

PCC Shoulder (Tied)¹³

11" PCC Pavement (Jointed)³

4" HMA Stabilized Subbase²

12" Aggregate Subgrade Improvement^{11,12}

I-90/94 Ramp at Lake St

Reconstruction

PCC Shoulder (Tied)¹³

9 ¼" PCC Pavement (Jointed)⁴

4" HMA Stabilized Subbase²

12" Aggregate Subgrade Improvement^{11,12}

**I-90/94 Ramp at Randolph St/Washington/Blvd/Madison St/
Adams St/Jackson Blvd/Roosevelt Rd/**

Reconstruction

PCC Shoulder (Tied)¹³

9" PCC Pavement (Jointed)⁵

4" HMA Stabilized Subbase²

12" Aggregate Subgrade Improvement^{11,12}

I-90/94 Ramp at Taylor St

Reconstruction

PCC Shoulder (Tied)¹³

9 ¾" PCC Pavement (Jointed)⁶

4" HMA Stabilized Subbase²

12" Aggregate Subgrade Improvement^{11,12}

IDOT Maintenance Lot/Accident Investigation Site

Reconstruction

PCC Shoulder (Tied)¹³

12 ½" PCC Pavement (Jointed)⁷

4" HMA Stabilized Subbase²

12" Aggregate Subgrade Improvement^{11,12}

Southbound I-90/94 Mainline Lanes

Pavement Widening

17" Composite Pavement

1 ¾" Polymerized HMA Surface Course, SMA, 9.5, Mix "F", N80⁸

2 ¼" Polymerized HMA Binder Course, IL-19.0, N90⁹

13" PCC Base Course Widening¹⁰

4" HMA Stabilized Subbase²

12" Aggregate Subgrade Improvement^{11,12}

¹Designer Note 1: Use pay item **42100350, CONTINUOUSLY REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT 12 ½"**, paid for in square yards.

²Designer Note 2: Use pay item **31200500, STABILIZED SUBBASE – HOT MIX ASPHALT, 4"**, paid for in square yards.

³Designer Note 3: Use pay item **42000521, PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)**, paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

⁴Designer Note 4: Use pay item **42000406, PORTLAND CEMENT CONCRETE PAVEMENT 9 ¼" (JOINTED)**, paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

⁵Designer Note 5: Use pay item **42000401, PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)**, paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

⁶Designer Note 6: Use pay item **42000416, PORTLAND CEMENT CONCRETE PAVEMENT 9 ¾" (JOINTED)**, paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

⁷Designer Note 7: Use pay item **42000551, PORTLAND CEMENT CONCRETE PAVEMENT 12 ½" (JOINTED)**, paid for in square yards.

⁸Designer Note 8: Use pay item **40605026, POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, SMA, 9.5, MIX 'F', N80** paid for in tons.

⁹Designer Note 9: Use pay item **40603240, POLYMERIZED HMA BINDER COURSE, IL-19.0, N90** paid for in tons.

¹⁰Designer Note 10: Use pay item **35400530, PORTLAND CEMENT CONCRETE BASE COURSE WIDENING 13"** paid for in square yards.

¹¹Designer Note 11: Use pay item **30300112, AGGREGATE SUBGRADE IMPROVEMENT, 12"**, paid in square yards.

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¹²Designer Note 12: Additional subgrade may be required in areas that are specified for undercut per the geotechnical report.

¹³Designer Note 13: The designer should refer to the guidelines in BDE Manual 34-2.02 for shoulder thicknesses.

If you have any questions or need additional information, please contact Ojas Patel, Pavement Design Engineer, at (847)705-4550.

By: 
Jose A. Dominguez, P.E.
Project Support Engineer

SCOPE OF WORK
for
Circle Interchange (I-90/94 and I-290/Congress Parkway)

CONTRACT 62A76

NB I-90/94

Section 2015-019R
Job Number C-91-310-15
PTB 163-001

June 21, 2019

This improvement consists of the reconstruction of Northbound I-90/94 from Roosevelt Road to Madison Street and resurfacing of Northbound I-90/94 from Madison Street to Lake Street. The limits of work on Northbound I-90/94 are estimated to be from south of Roosevelt Road to north of Lake Street. The estimated length of improvement is approximately 7,508'. The work also includes retaining wall construction, drainage, underpass, and City street lighting, signing, traffic control and protection, landscaping, urban enhancements and pavement markings.

Permanent roadway and shoulder pavement will be constructed along Northbound I-90/94, Roosevelt Street Entrance Ramp, Taylor Street Entrance Ramp, the Northbound Collector-Distributor (C-D) Road, Jackson Boulevard Entrance Ramp, Adams Street Entrance Ramp, Madison Street Exit Ramp, Washington Boulevard Exit Ramp, Lake Street Exit Ramp, Randolph Street Exit Ramp, Ramp WN, Ramp EN, and Ramp EN Slip Ramp. In addition, an IDOT maintenance parking lot is proposed under I-290 east of NB I-90/94. Temporary pavement will be constructed along NB I-90/94 and some of the ramps for maintenance of traffic purposes. The temporary pavement will be installed in the Pre-Stage, Stage 1 and Stage 3 and will be removed after approximately 2 years.



PROJECT LOCATION MAP
CONTRACT 62A76
NB I-90/94
SECTION 2015-019R
C-91-310-15
NOT TO SCALE

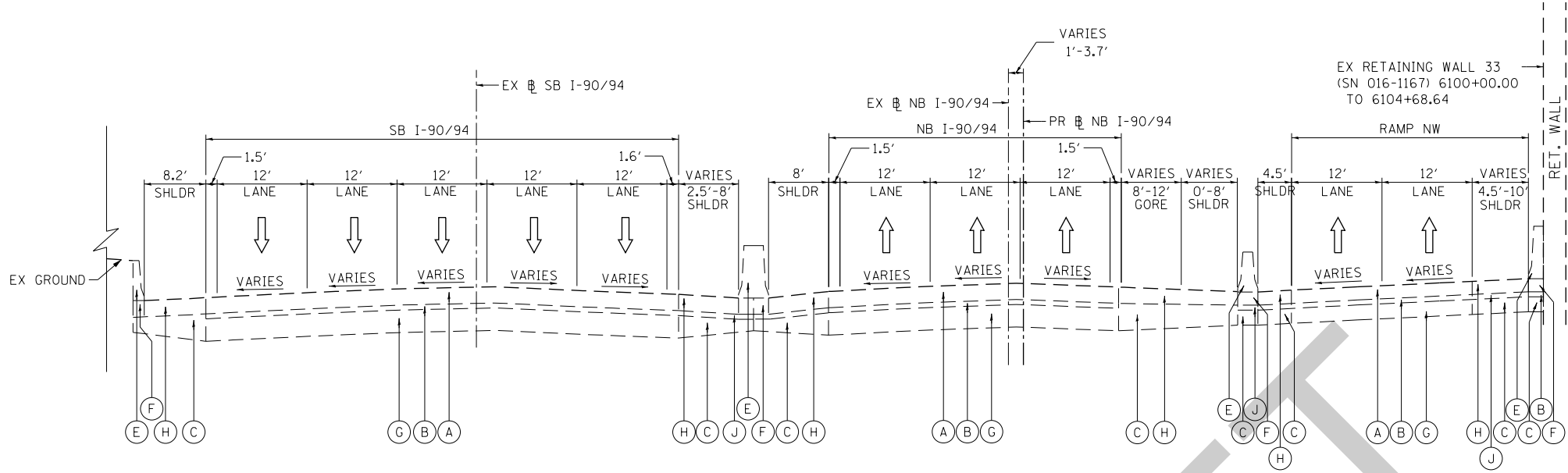
PROPOSED

- ① PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- ② PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- ③ STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- ④ AGGREGATE SUBGRADE IMPROVEMENT 12"
- ⑤ SUBBASE GRANULAR MATERIAL, TYPE C 4"
- ⑥ CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- ⑦ CONCRETE BARRIER BASE
- ⑧ TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- ⑨ PIPE UNDERDRAINS, TYPE 2, 6"
- ⑩ TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- ⑪ CONCRETE GUTTER TYPE A
- ⑫ ITEM NOT USED
- ⑬ COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- ⑭ ITEM NOT USED
- ⑮ ITEM NOT USED
- ⑯ ITEM NOT USED
- ⑰ ITEM NOT USED
- ⑱ ITEM NOT USED
- ⑲ TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- ⑳ ITEM NOT USED
- ㉑ CONCRETE MEDIAN SURFACE, 4"
- ㉒ ITEM NOT USED
- ㉓ ITEM NOT USED
- ㉔ CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- ㉕ CONCRETE BARRIER BASE (SPECIAL NO. 1)
- ㉖ CONCRETE CURB, TYPE B
- ㉗ PORTLAND CEMENT CONCRETE PAVEMENT 8"
- ㉘ POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- ㉙ POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

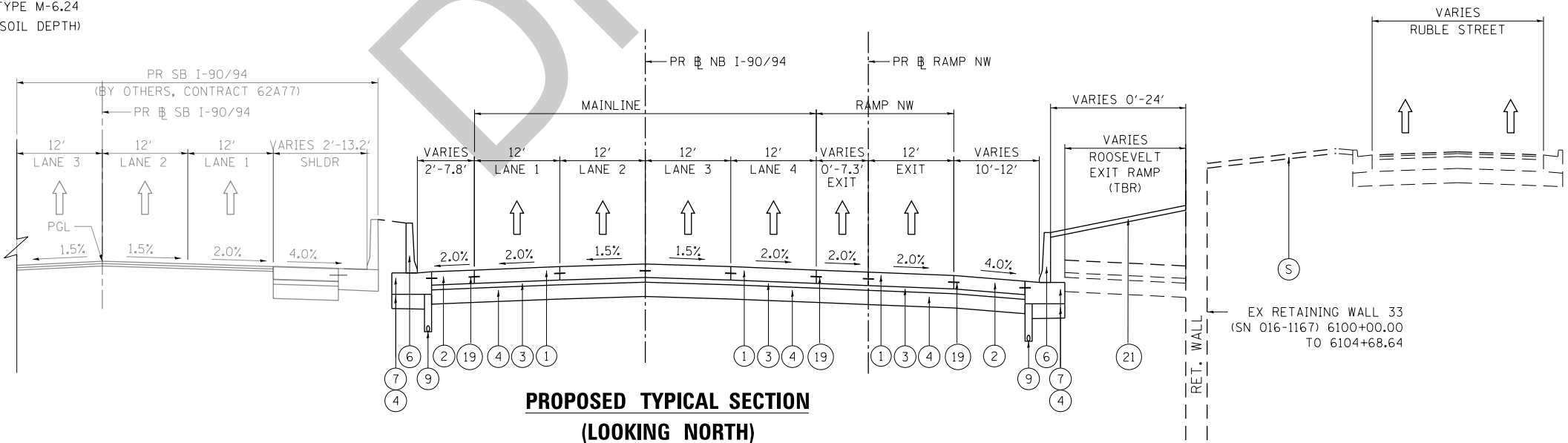


EXISTING

- Ⓐ CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- Ⓑ STABILIZED SUBBASE, 4"
- Ⓒ POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
- Ⓓ HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- Ⓔ CONCRETE BARRIER
- Ⓕ CONCRETE BARRIER BASE
- Ⓖ SUBBASE GRANULAR MATERIAL, 12"
- Ⓗ HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- Ⓘ TEMPORARY PAVEMENT
- Ⓝ SUBBASE GRANULAR MATERIAL, 4"
- Ⓚ AGGREGATE SUBGRADE 12"
- Ⓛ PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- Ⓜ SUBBASE GRANULAR MATERIAL, 8"
- Ⓝ CONCRETE MEDIAN SURFACE
- Ⓞ PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- Ⓟ AGGREGATE SURFACE COURSE
- Ⓠ HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- Ⓡ COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- Ⓢ GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

EXISTING TYPICAL SECTION
(LOOKING NORTH)

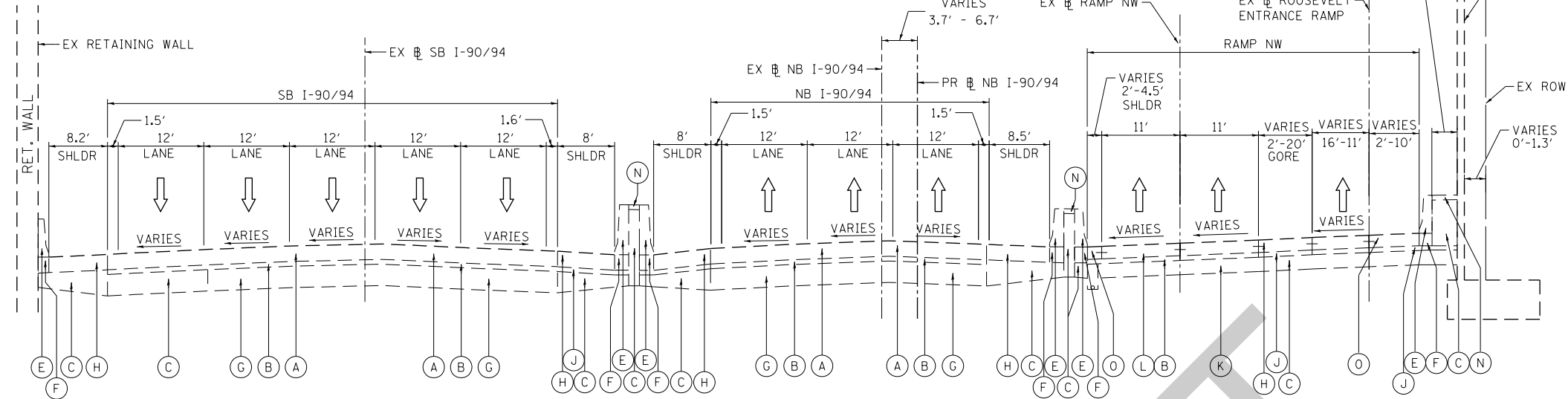
PR NB I-90/94
STA 6100+00.00 TO STA 6110+60.77



PROPOSED TYPICAL SECTION
(LOOKING NORTH)

PR NB I-90/94
STA 6100+00.00 TO STA 6108+17.74

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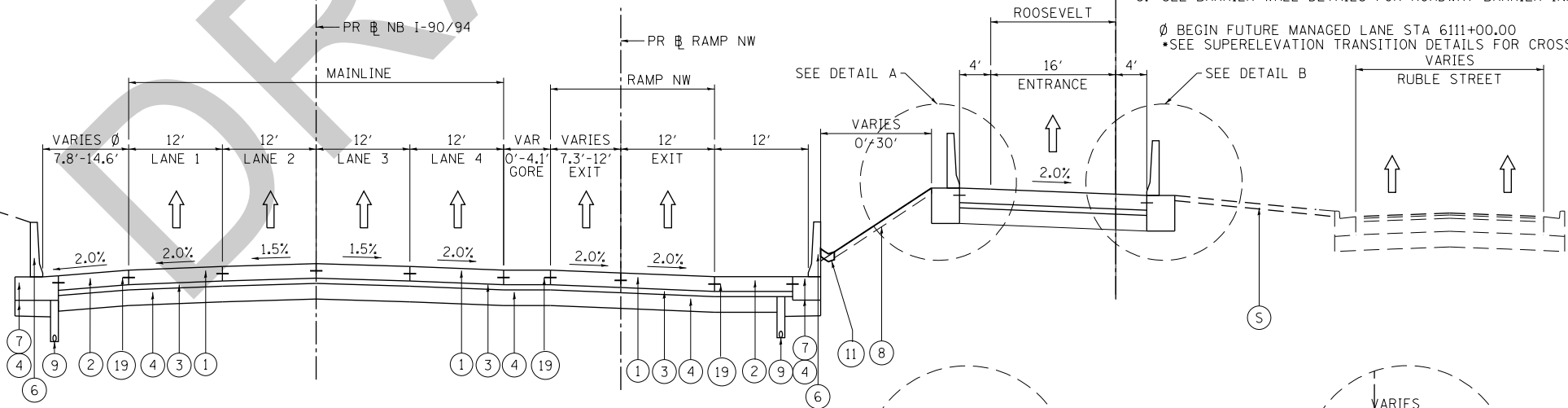
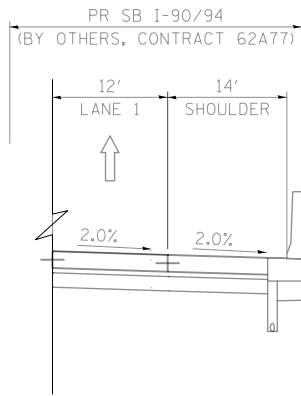


**EXISTING TYPICAL SECTION
(LOOKING NORTH)**

PR NB I-90/94
STA 6110+60.77 TO STA 6113+40.77

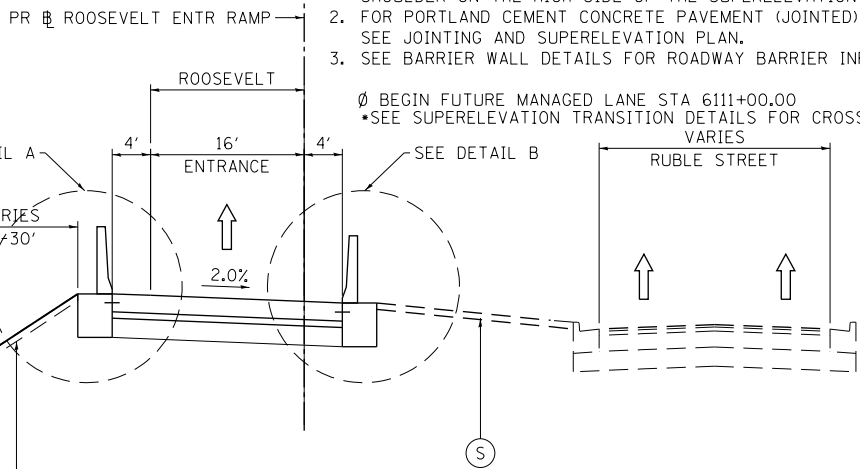
EXISTING

- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- (B) STABILIZED SUBBASE, 4"
- (C) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
- (D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- (E) CONCRETE BARRIER
- (F) CONCRETE BARRIER BASE
- (G) SUBBASE GRANULAR MATERIAL, 12"
- (H) HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- (I) TEMPORARY PAVEMENT
- (J) SUBBASE GRANULAR MATERIAL, 4"
- (K) AGGREGATE SUBGRADE 12"
- (L) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- (M) SUBBASE GRANULAR MATERIAL, 8"
- (N) CONCRETE MEDIAN SURFACE
- (O) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- (P) AGGREGATE SURFACE COURSE
- (Q) HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- (R) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)



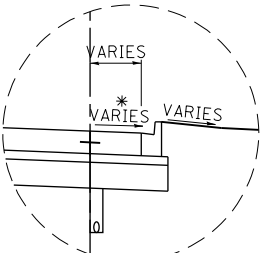
**PROPOSED TYPICAL SECTION
(LOOKING NORTH)**

PR NB I-90/94
STA 6108+17.74 TO STA 6111+29.73



DETAIL A

CURB AND GUTTER FROM:
STA 6108+17.74 TO STA 6109+89.07



DETAIL B

CURB AND GUTTER FROM:
STA 6109+92.13 TO STA 6110+64.08

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- (3) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (4) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (5) SUBBASE GRANULAR MATERIAL, TYPE C 4"
- (6) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- (7) CONCRETE BARRIER BASE
- (8) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- (9) PIPE UNDERDRAINS, TYPE 2, 6"
- (10) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- (11) CONCRETE GUTTER TYPE A
- (12) ITEM NOT USED
- (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- (14) ITEM NOT USED
- (15) ITEM NOT USED
- (16) ITEM NOT USED
- (17) ITEM NOT USED
- (18) ITEM NOT USED
- (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- (20) ITEM NOT USED
- (21) CONCRETE MEDIAN SURFACE, 4"
- (22) ITEM NOT USED
- (23) ITEM NOT USED
- (24) CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- (25) CONCRETE BARRIER BASE (SPECIAL NO. 1)
- (26) CONCRETE CURB, TYPE B
- (27) PORTLAND CEMENT CONCRETE PAVEMENT 8"
- (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- (29) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
- 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

Ø BEGIN FUTURE MANAGED LANE STA 6111+00.00
*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES VARIES



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DATE - 6/21/19

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REVISED -

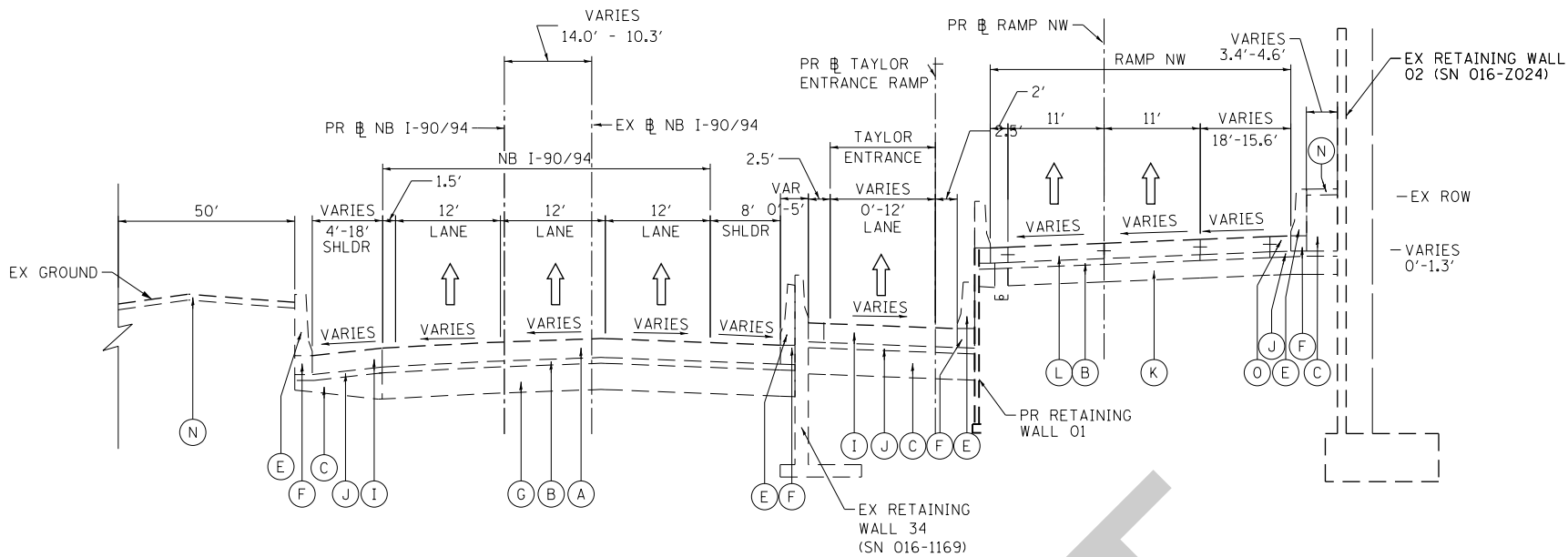
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-90/94

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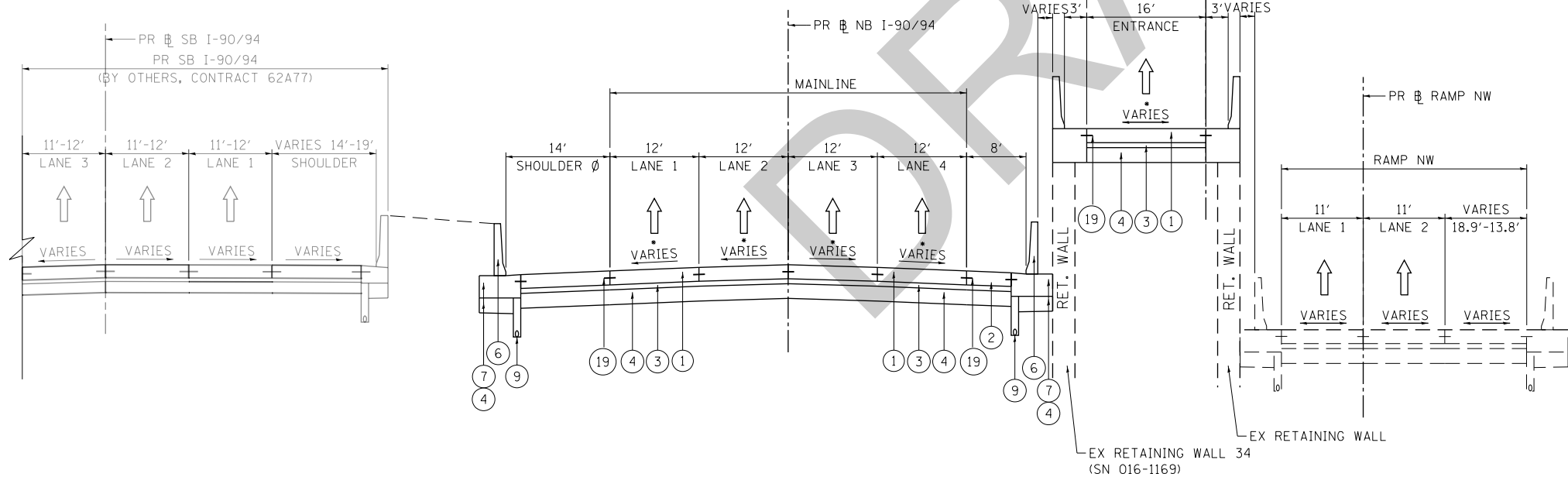
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ILLINOIS FED. AID PROJECT				

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**EXISTING TYPICAL SECTION
(LOOKING NORTH)**

PR NB I-90/94
STA 6120+44.61 TO STA 6121+59.43



**PROPOSED TYPICAL SECTION
(LOOKING NORTH)**

PR NB I-90/94
STA 6114+64.26 TO STA 6119+92.46

EXISTING

- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- (B) STABILIZED SUBBASE, 4"
- (C) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
- (D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- (E) CONCRETE BARRIER
- (F) CONCRETE BARRIER BASE
- (G) SUBBASE GRANULAR MATERIAL, 12"
- (H) HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- (I) TEMPORARY PAVEMENT
- (J) SUBBASE GRANULAR MATERIAL, 4"
- (K) AGGREGATE SUBGRADE 12"
- (L) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- (M) SUBBASE GRANULAR MATERIAL, 8"
- (N) CONCRETE MEDIAN SURFACE
- (O) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- (P) AGGREGATE SURFACE COURSE
- (Q) HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- (R) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- (3) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (4) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (5) SUBBASE GRANULAR MATERIAL, TYPE C 4"
- (6) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- (7) CONCRETE BARRIER BASE
- (8) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- (9) PIPE UNDERDRAINS, TYPE 2, 6"
- (10) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- (11) CONCRETE GUTTER TYPE A
- (12) ITEM NOT USED
- (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- (14) ITEM NOT USED
- (15) ITEM NOT USED
- (16) ITEM NOT USED
- (17) ITEM NOT USED
- (18) ITEM NOT USED
- (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- (20) ITEM NOT USED
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- (22) ITEM NOT USED
- (23) ITEM NOT USED
- (24) CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- (25) CONCRETE BARRIER BASE (SPECIAL NO. 1)
- (26) CONCRETE CURB, TYPE B
- (27) PORTLAND CEMENT CONCRETE PAVEMENT 8"
- (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- (29) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
- 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

Ø BEGIN FUTURE MANAGED LANE STA 6111+00.00
*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES



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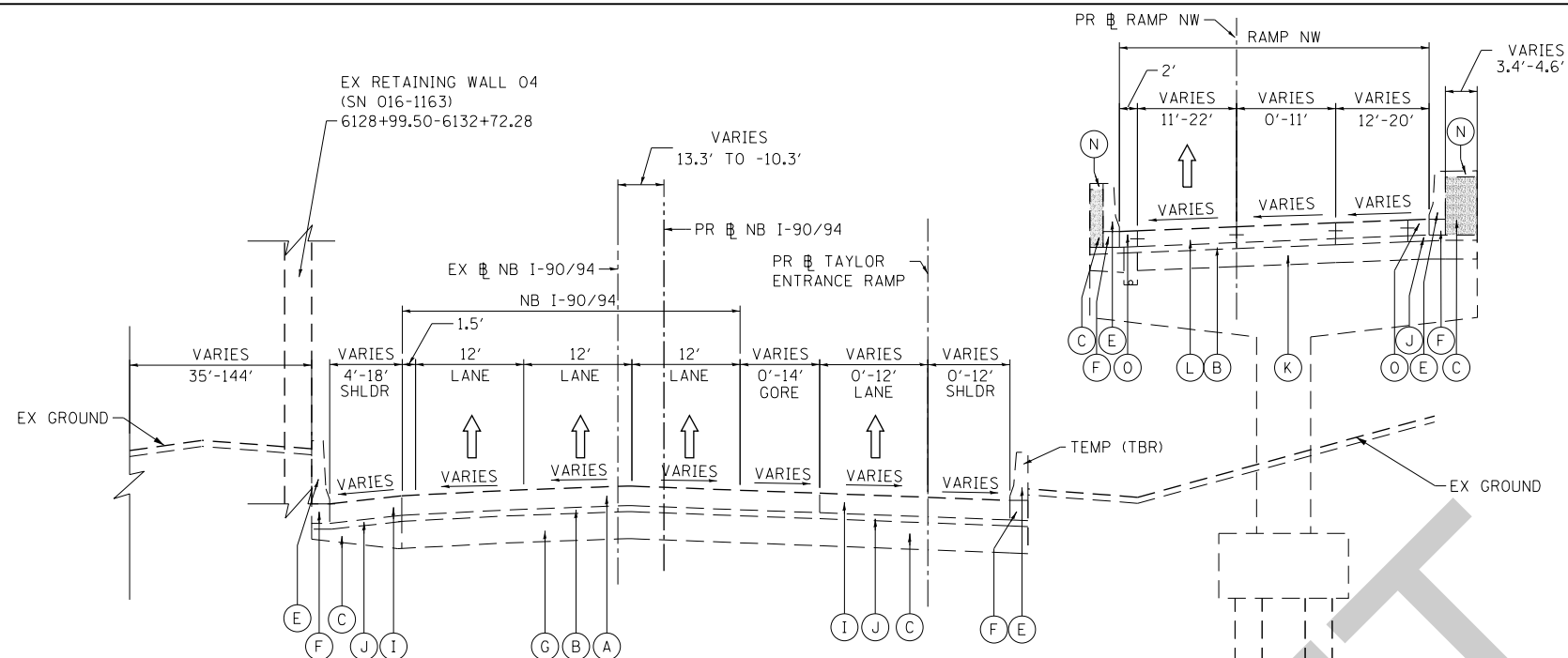
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-90/94

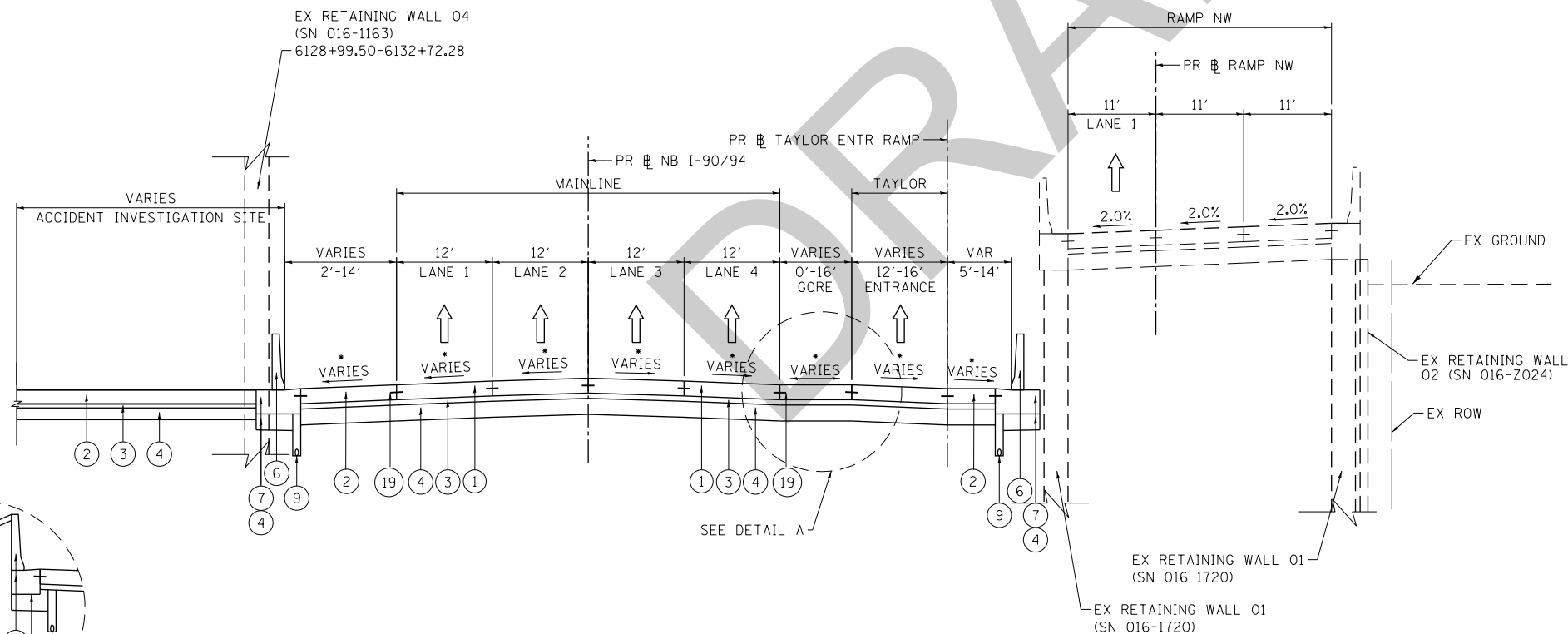
SCALE: NONE SHEET 4 OF 17 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-019R	COOK	1255	30
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				



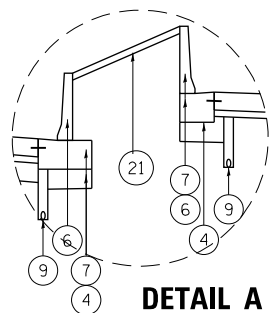
EXISTING TYPICAL SECTION
(LOOKING NORTH)

PR ~~B~~ I-90/94
STA 6121+59.43 TO STA 6138+60.62



PROPOSED TYPICAL SECTION
(LOOKING NORTH)

PR 8 NB I-90/94
STA 6119+92.46 TO STA 6128+29.23



DETAIL A

MEDIAN BARRIER FROM:
STA 6120+44.59 TO STA 6121+95.31

D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -
USER NAME = jrmiller	DRAWN - TTP	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED - JMG	REVISED -
PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -

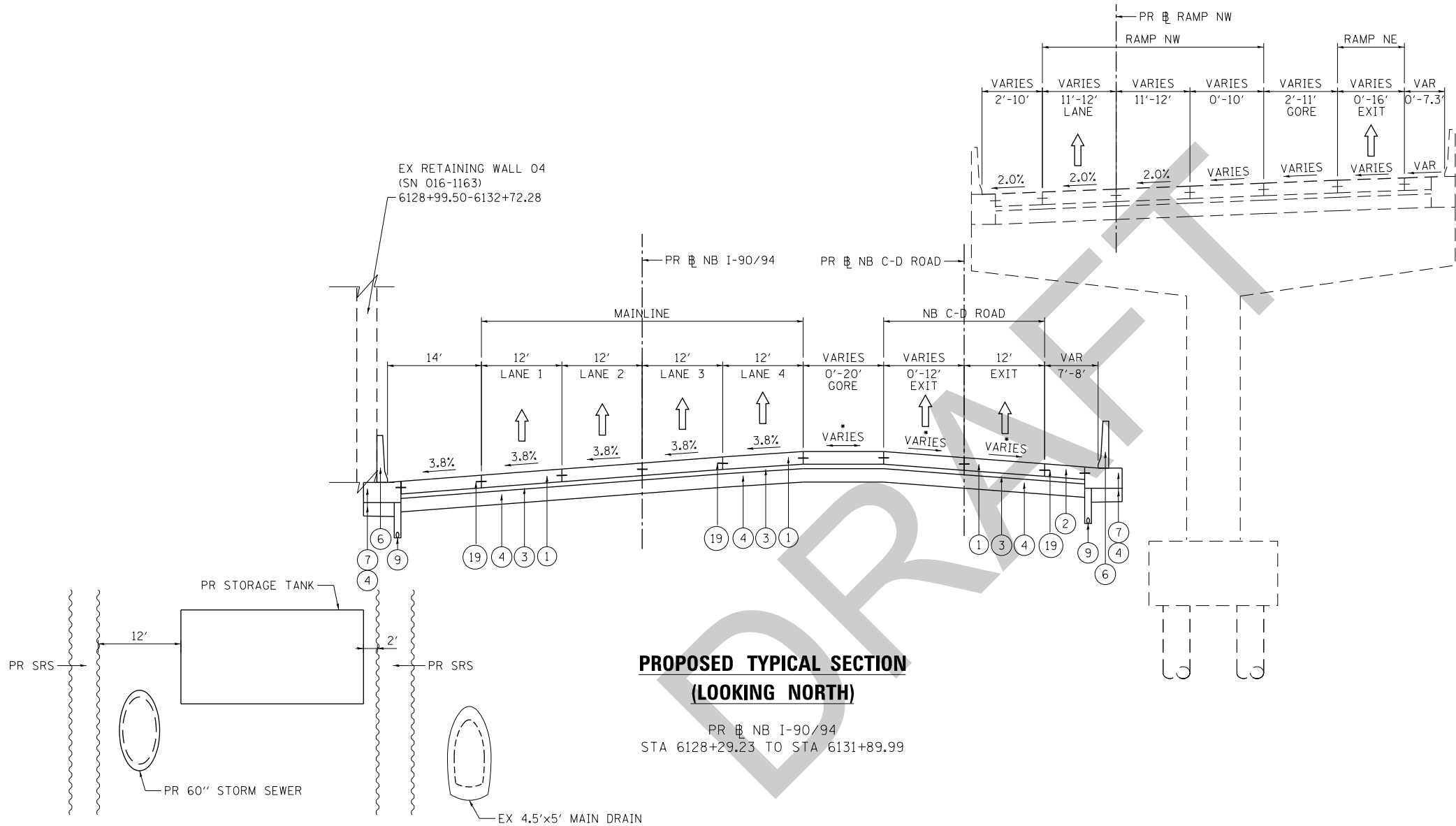
**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

TYPICAL SECTIONS

SCALE: NONE	SHEET 5	OF 17	SHEETS	STA.	TO STA.
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F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-019R	COOK	1255	31
		CONTRACT NO. 62A76		
ILLINOIS		FED. AID PROJECT		

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PROPOSED

- ① PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- ② PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- ③ STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- ④ AGGREGATE SUBGRADE IMPROVEMENT 12"
- ⑤ SUBBASE GRANULAR MATERIAL, TYPE C 4"
- ⑥ CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- ⑦ CONCRETE BARRIER BASE
- ⑧ TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- ⑨ PIPE UNDERDRAINS, TYPE 2, 6"
- ⑩ TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- ⑪ CONCRETE GUTTER TYPE A
- ⑫ ITEM NOT USED
- ⑬ COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- ⑭ ITEM NOT USED
- ⑮ ITEM NOT USED
- ⑯ ITEM NOT USED
- ⑰ ITEM NOT USED
- ⑱ ITEM NOT USED
- ⑲ TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- ⑳ ITEM NOT USED
- ㉑ CONCRETE MEDIAN SURFACE, 4"
- ㉒ ITEM NOT USED
- ㉓ ITEM NOT USED
- ㉔ CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- ㉕ CONCRETE BARRIER BASE (SPECIAL NO. 1)
- ㉖ CONCRETE CURB, TYPE B
- ㉗ PORTLAND CEMENT CONCRETE PAVEMENT 8"
- ㉘ POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- ㉙ POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

•SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES



D162A76-sht-Typical-01.dgn
USER NAME = jrmiller
PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - MKW
DRAWN - TTP
CHECKED - JMG
DATE - 6/21/19

REVISED -
REVISED -
REVISED -
REVISED -

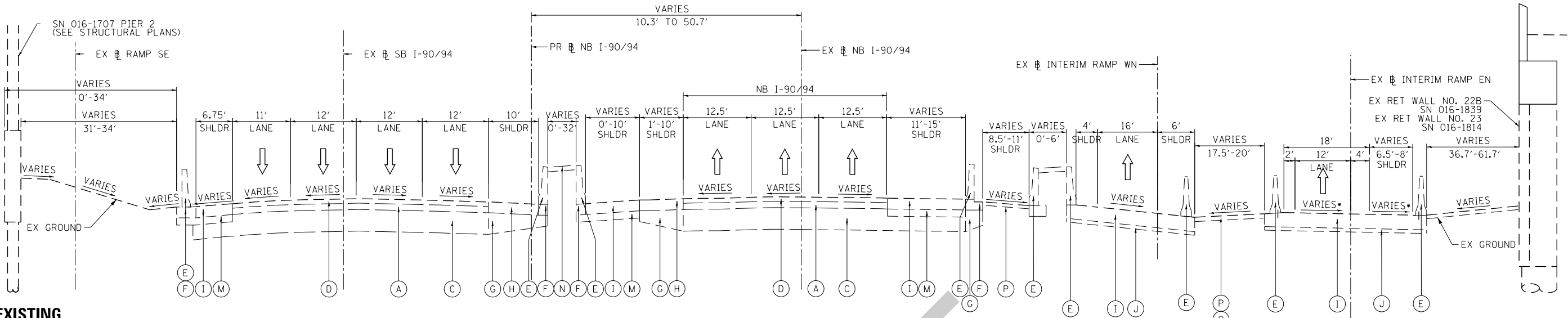
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-90/94

SCALE: NONE SHEET 6 OF 17 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-019R	COOK	1255	32
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

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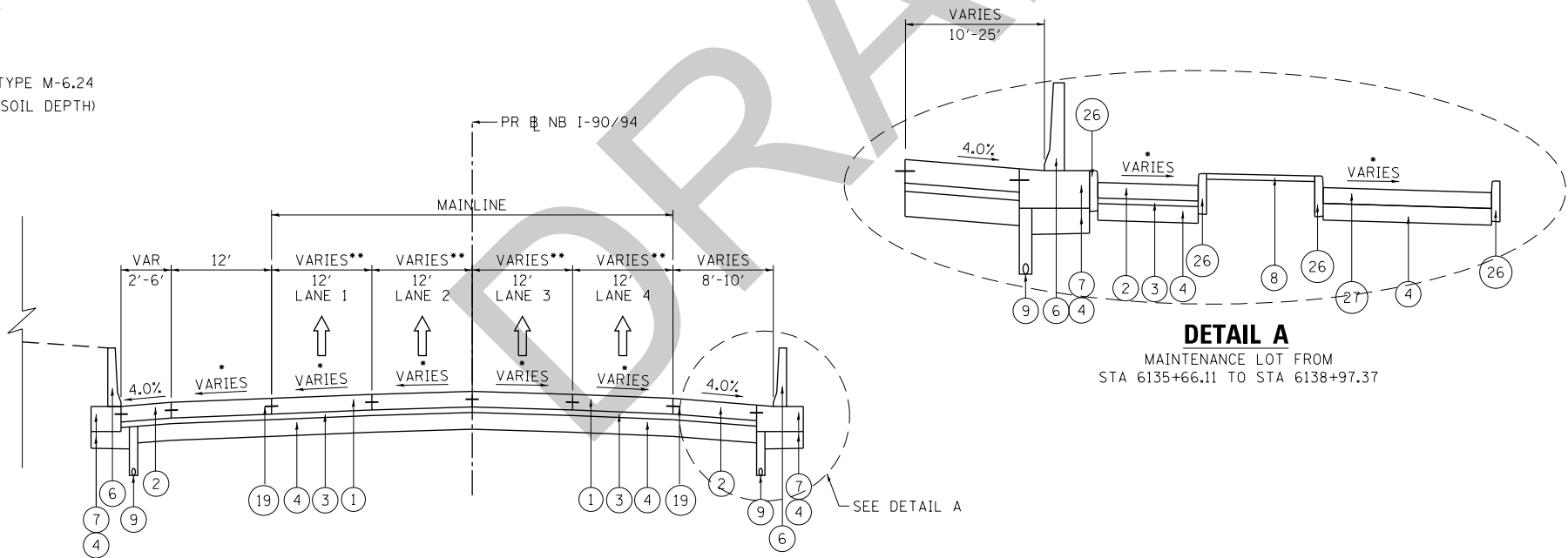


EXISTING

- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- (B) STABILIZED SUBBASE, 4"
- (C) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
- (D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- (E) CONCRETE BARRIER
- (F) CONCRETE BARRIER BASE
- (G) SUBBASE GRANULAR MATERIAL, 12"
- (H) HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- (I) TEMPORARY PAVEMENT
- (J) SUBBASE GRANULAR MATERIAL, 4"
- (K) AGGREGATE SUBGRADE 12"
- (L) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- (M) SUBBASE GRANULAR MATERIAL, 8"
- (N) CONCRETE MEDIAN SURFACE
- (O) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- (P) AGGREGATE SURFACE COURSE
- (Q) HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- (R) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

EXISTING TYPICAL SECTION
(LOOKING NORTH)

PR NB I-90/94
STA 6138+60.62 TO STA 6147+70.77



PROPOSED TYPICAL SECTION
(LOOKING NORTH)

PR NB I-90/94
STA 6131+89.99 TO STA 6139+26.76

** LANE TAPER FROM 12' TO 11'
STA 6137+60.77 TO 6139+26.76

++ MAINTENANCE LOT FROM
STA 6135+66.11 TO STA 6138+97.37

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- (3) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (4) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (5) SUBBASE GRANULAR MATERIAL, TYPE C 4"
- (6) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- (7) CONCRETE BARRIER BASE
- (8) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- (9) PIPE UNDERDRAINS, TYPE 2, 6"
- (10) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- (11) CONCRETE GUTTER TYPE A
- (12) ITEM NOT USED
- (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- (14) ITEM NOT USED
- (15) ITEM NOT USED
- (16) ITEM NOT USED
- (17) ITEM NOT USED
- (18) ITEM NOT USED
- (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- (20) ITEM NOT USED
- (21) CONCRETE MEDIAN SURFACE, 4"
- (22) ITEM NOT USED
- (23) ITEM NOT USED
- (24) CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- (25) CONCRETE BARRIER BASE (SPECIAL NO. 1)
- (26) CONCRETE CURB, TYPE B
- (27) PORTLAND CEMENT CONCRETE PAVEMENT 8"
- (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- (29) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
- 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES



D162A76-shr-Typical-01.dgn
USER NAME = jrmiller
PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - MKW
DRAWN - TTP
CHECKED - JMG
DATE - 6/21/19

REVISED -
REVISED -
REVISED -
REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-90/94

SCALE: NONE SHEET 7 OF 17 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-019R	COOK	1255	33
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

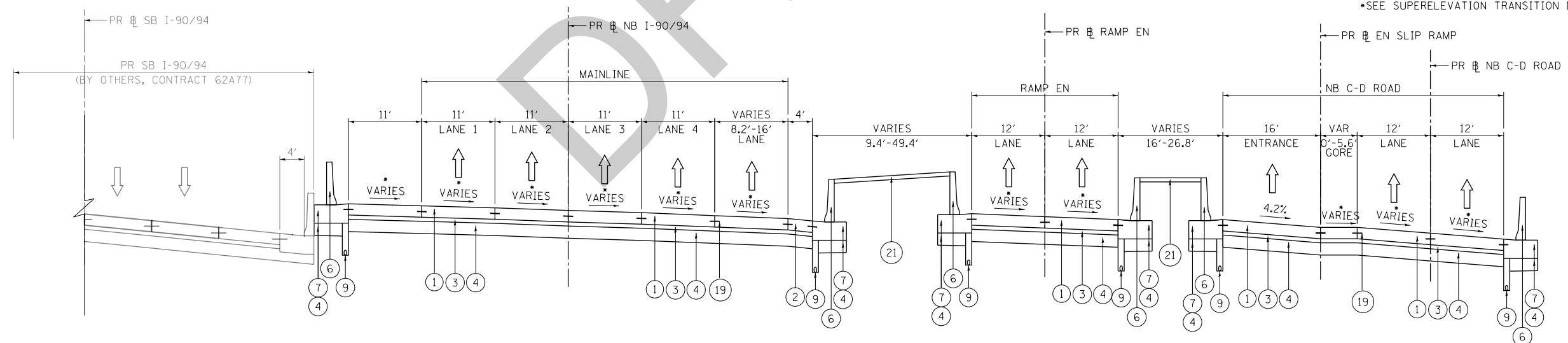
PROPOSED

- ① PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- ② PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- ③ STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- ④ AGGREGATE SUBGRADE IMPROVEMENT 12"
- ⑤ SUBBASE GRANULAR MATERIAL, TYPE C 4"
- ⑥ CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- ⑦ CONCRETE BARRIER BASE
- ⑧ TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING,
(SEE EROSION CONTROL PLANS)
- ⑨ PIPE UNDERDRAINS, TYPE 2, 6"
- ⑩ TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- ⑪ CONCRETE GUTTER TYPE A
- ⑫ ITEM NOT USED
- ⑬ COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- ⑭ ITEM NOT USED
- ⑮ ITEM NOT USED
- ⑯ ITEM NOT USED
- ⑰ ITEM NOT USED
- ⑱ ITEM NOT USED
- ⑲ TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR
PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS
SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- ⑳ ITEM NOT USED
- ㉑ CONCRETE MEDIAN SURFACE, 4"
- ㉒ ITEM NOT USED
- ㉓ ITEM NOT USED
- ㉔ CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- ㉕ CONCRETE BARRIER BASE (SPECIAL NO. 1)
- ㉖ CONCRETE CURB, TYPE B
- ㉗ PORTLAND CEMENT CONCRETE PAVEMENT 8"
- ㉘ POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE,
STONE MATRIX ASPHALT, 12.5 N80 2"
- ㉙ POLYMERIZED HOT-MIX ASPHALT BINDER COURSE,
STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES



PROPOSED TYPICAL SECTION
(LOOKING NORTH)

PR & NB I-90/94
STA 6141+34.86 TO STA 6144+04.70

<div><div><div></div><div>TranSystems</div></div></div>	D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -	<div><div>STATE OF ILLINOIS</div><div>DEPARTMENT OF TRANSPORTATION</div></div>	<div><div>TYPICAL SECTIONS</div><div>I-90/94</div></div>				F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	USER NAME = jrmiller	DRAWN - TTP	REVISED -						90/94/290	2015-019R	COOK	1255	35
	PLOT SCALE = 20.0000 ' / in.	CHECKED - JMG	REVISED -		CONTRACT NO. 62A76								
	PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -		SCALE: NONE	SHEET 9	OF 17 SHEETS	STA. TO STA.	ILLINOIS FED. AID PROJECT				

PROPOSED

- 1

PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- 2

PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- 3

STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- 4

AGGREGATE SUBGRADE IMPROVEMENT 12"
- 5

SUBBASE GRANULAR MATERIAL, TYPE C 4"
- 6

CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- 7

CONCRETE BARRIER BASE
- 8

TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING,
(SEE EROSION CONTROL PLANS)
- 9

PIPE UNDERDRAINS, TYPE 2, 6"
- 10

TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- 11

CONCRETE GUTTER TYPE A
- 12

ITEM NOT USED
- 13

COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- 14

ITEM NOT USED
- 15

ITEM NOT USED
- 16

ITEM NOT USED
- 17

ITEM NOT USED
- 18

ITEM NOT USED
- 19

TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR
PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS
SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- 20

ITEM NOT USED
- 21

CONCRETE MEDIAN SURFACE, 4"
- 22

ITEM NOT USED
- 23

ITEM NOT USED
- 24

CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- 25

CONCRETE BARRIER BASE (SPECIAL NO. 1)
- 26

CONCRETE CURB, TYPE B
- 27

PORTLAND CEMENT CONCRETE PAVEMENT 8"
- 28

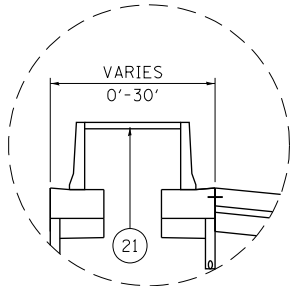
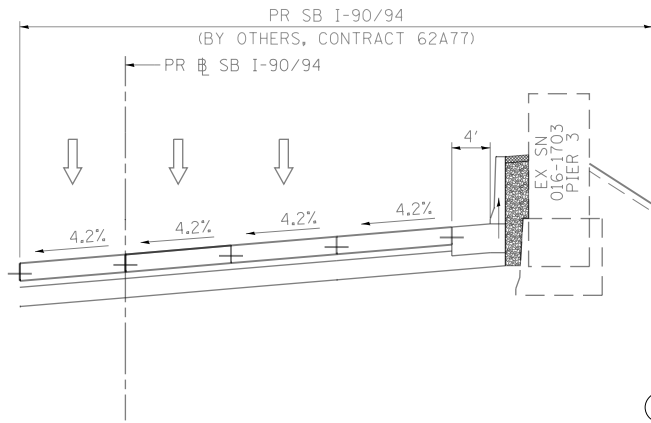
POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE,
STONE MATRIX ASPHALT, 12.5 N80 2"
- 29

POLYMERIZED HOT-MIX ASPHALT BINDER COURSE,
STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE
SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS,
SEE JOINTING AND SUPERELEVATION PLAN.
3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

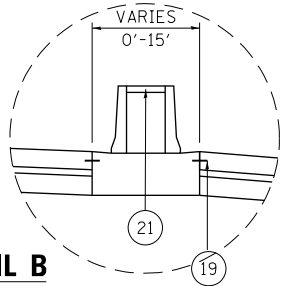
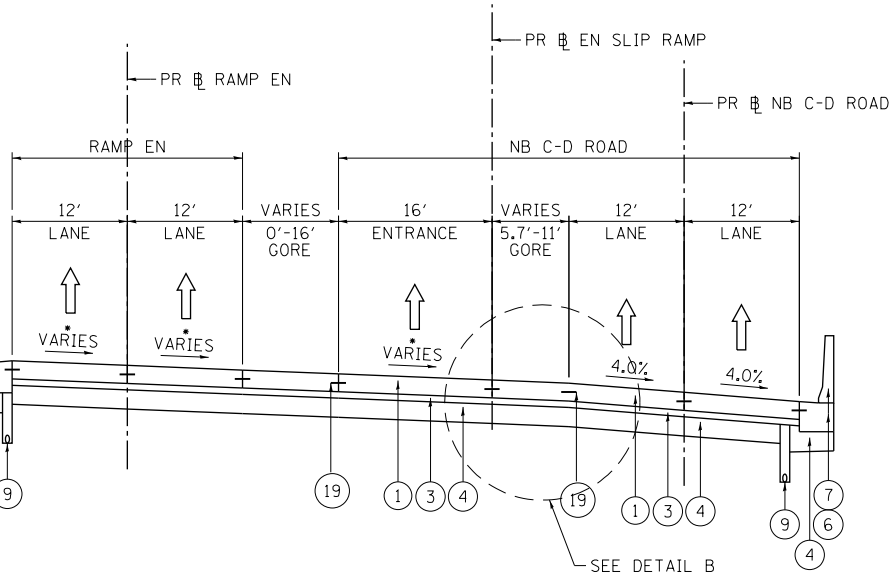


DETAIL A

BARRIER FROM
STA 6139+26.76 TO STA 6139+95.15

PROPOSED TYPICAL SECTION
(LOOKING NORTH)

PR NB I-90/94
STA 6139+26.76 TO STA 6141+34.86



DETAIL B

BARRIER FROM
STA 6139+26.76 TO STA 6140+04.56



D162A76-sh-typical-01.dgn	DESIGNED - MKW	REVISED -
USER NAME = jrmiller	DRAWN - TTP	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED - JMG	REVISED -
PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -

DESIGNED - MKW	REVISED -
DRAWN - TTP	REVISED -
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DATE - 6/21/19	REVISED -

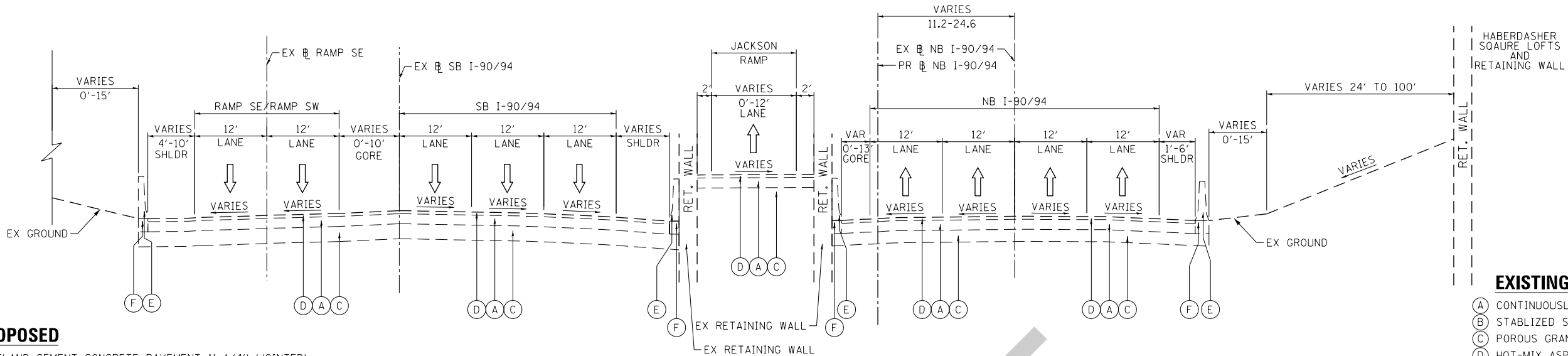
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-90/94

SCALE: NONE SHEET 8 OF 17 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-019R	COOK	1255	34
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

FILE PATH = p:\V\ECOM-NH-AV5\seccom\line\local\I-90\I-90\CD\006_Roadway\Sheets\62A76_Contract\0162A76-shr-Typical-01.dgn



PROPOSED

- 1 PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- 2 PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- 3 STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- 4 AGGREGATE SUBGRADE IMPROVEMENT 12"
- 5 SUBBASE GRANULAR MATERIAL, TYPE C 4"
- 6 CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- 7 CONCRETE BARRIER BASE
- 8 TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- 9 PIPE UNDERDRAINS, TYPE 2, 6"
- 10 TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- 11 CONCRETE GUTTER TYPE A
- 12 ITEM NOT USED
- 13 COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- 14 ITEM NOT USED
- 15 ITEM NOT USED
- 16 ITEM NOT USED
- 17 ITEM NOT USED
- 18 ITEM NOT USED
- 19 TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- 20 ITEM NOT USED
- 21 CONCRETE MEDIAN SURFACE, 4"
- 22 ITEM NOT USED
- 23 ITEM NOT USED
- 24 CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- 25 CONCRETE BARRIER BASE (SPECIAL NO. 1)
- 26 CONCRETE CURB, TYPE B
- 27 PORTLAND CEMENT CONCRETE PAVEMENT 8"
- 28 POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- 29 POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

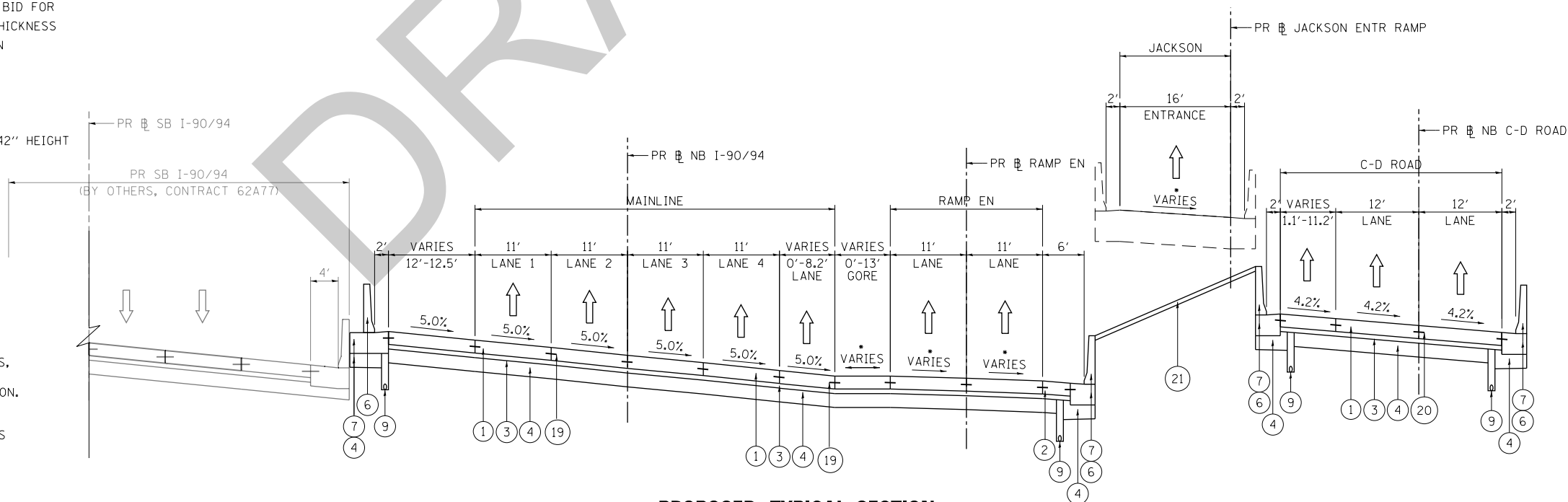
NOTES:

1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

EXISTING TYPICAL SECTION (LOOKING NORTH)

PR I-90/94
STA 6147+70.77 TO STA 6152+34.42



PROPOSED TYPICAL SECTION (LOOKING NORTH)

PR NB I-90/94
STA 6144+04.70 TO STA 6147+02.10

EXISTING

- A CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- B STABILIZED SUBBASE, 4"
- C POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
- D HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- E CONCRETE BARRIER
- F CONCRETE BARRIER BASE
- G SUBBASE GRANULAR MATERIAL, 12"
- H HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- I TEMPORARY PAVEMENT
- J SUBBASE GRANULAR MATERIAL, 4"
- K AGGREGATE SUBGRADE 12"
- L PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- M SUBBASE GRANULAR MATERIAL, 8"
- N CONCRETE MEDIAN SURFACE
- O PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- P AGGREGATE SURFACE COURSE
- Q HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- R COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- S GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)



D162A76-shr-Typical-01.dgn
USER NAME = jrmiller
PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - MKW
DRAWN - TTP
CHECKED - JMG
DATE - 6/21/19

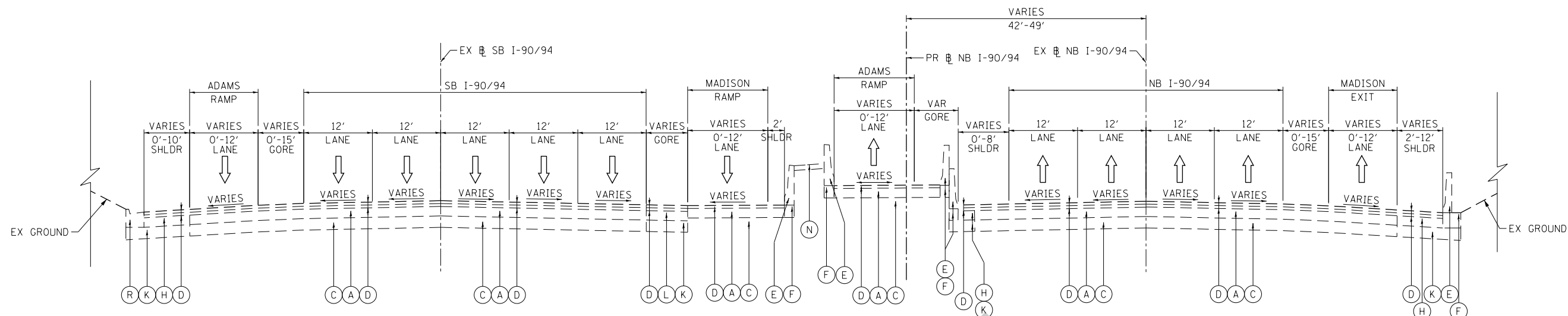
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REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-90/94

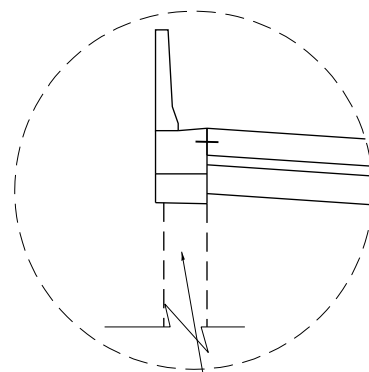
SCALE: NONE SHEET 10 OF 17 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-019R	COOK	1255	36
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				



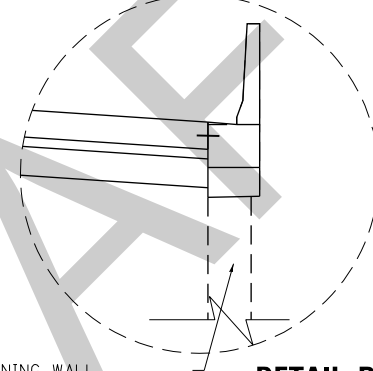
EXISTING TYPICAL SECTION
(LOOKING NORTH)

PR ~~B~~ I-90/94
STA 6152+34.42 TO STA 6155+68.09



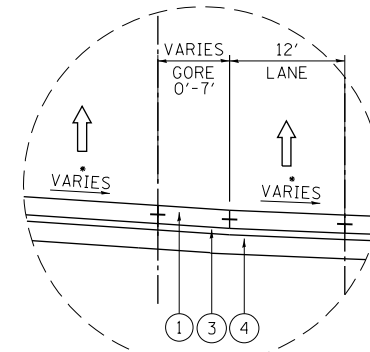
DETAIL A

RETAINING WALL FROM
STA 6147+98.72 TO STA 6148+95.47



DETAIL B

RETAINING WALL FROM
STA 6147+98.19 TO STA 6148+48.26



DETAIL C

PAVED GORE FROM
STA 6149+04.146 TO STA 6150+78.65

- PROPOSED**

- ① PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- ② PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- ③ STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- ④ AGGREGATE SUBGRADE IMPROVEMENT 12"
- ⑤ SUBBASE GRANULAR MATERIAL, TYPE C 4"
- ⑥ CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- ⑦ CONCRETE BARRIER BASE
- ⑧ TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING,
(SEE EROSION CONTROL PLANS)
- ⑨ PIPE UNDERDRAINS, TYPE 2, 6"
- ⑩ TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- ⑪ CONCRETE GUTTER TYPE A
- ⑫ ITEM NOT USED
- ⑬ COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- ⑭ ITEM NOT USED
- ⑮ ITEM NOT USED
- ⑯ ITEM NOT USED
- ⑰ ITEM NOT USED
- ⑱ ITEM NOT USED
- ⑲ TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR
PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS
SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- ⑳ ITEM NOT USED
- ㉑ CONCRETE MEDIAN SURFACE, 4"
- ㉒ ITEM NOT USED
- ㉓ ITEM NOT USED
- ㉔ CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- ㉕ CONCRETE BARRIER BASE (SPECIAL NO. 1)
- ㉖ CONCRETE CURB, TYPE B
- ㉗ PORTLAND CEMENT CONCRETE PAVEMENT 8"
- ㉘ POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE,
STONE MATRIX ASPHALT, 12.5 N80 2"
- ㉙ POLYMERIZED HOT-MIX ASPHALT BINDER COURSE,
STONE MATRIX ASPHALT, 12.5 N80 2"

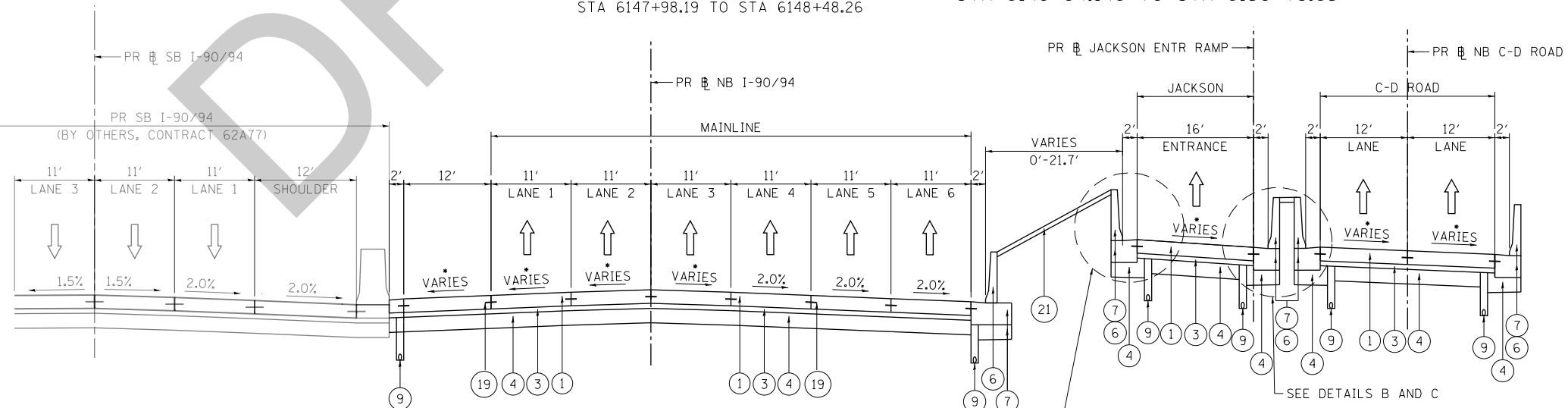
NOTES:

1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

- EXISTING**

- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- (B) STABILIZED SUBBASE, 4"
- (C) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
- (D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- (E) CONCRETE BARRIER
- (F) CONCRETE BARRIER BASE
- (G) SUBBASE GRANULAR MATERIAL, 12"
- (H) HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- (I) TEMPORARY PAVEMENT
- (J) SUBBASE GRANULAR MATERIAL, 4"
- (K) AGGREGATE SUBGRADE 12"
- (L) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- (M) SUBBASE GRANULAR MATERIAL, 8"
- (N) CONCRETE MEDIAN SURFACE
- (O) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- (P) AGGREGATE SURFACE COURSE
- (Q) HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- (R) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

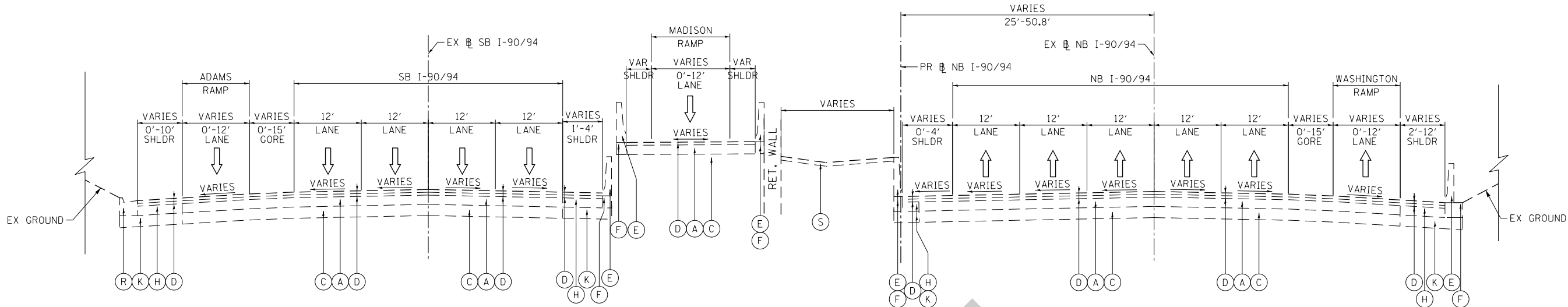


PROPOSED TYPICAL SECTION
(LOOKING NORTH)

PR & NB I-90/94
STA 6147+02.10 TO STA 6150+49.69

D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -	<div>STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION</div>	<div>TYPICAL SECTIONS I-90/94</div>					F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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PLOT SCALE = 20.0000' / in.	CHECKED - JMG	REVISED -		CONTRACT NO. 62A76									
PLOT DATE = 6/18/2019	DATE = 6/21/19	REVISED -		SCALE: NONE	SHEET 11	OF 17 SHEETS	STA.	TO STA.	ILLINOIS FED. AID PROJECT				

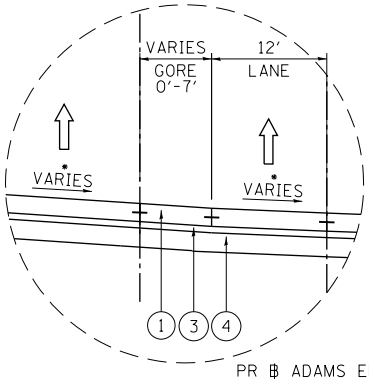
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**EXISTING TYPICAL SECTION
(LOOKING NORTH)**

PR I-90/94
STA 6155+68.09 TO STA 6159+43.99

DETAIL C
PAVED GORE FROM
STA 6154+76.30 TO STA 6156+45.94



EXISTING

- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- (B) STABILIZED SUBBASE, 4"
- (C) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
- (D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- (E) CONCRETE BARRIER
- (F) CONCRETE BARRIER BASE
- (G) SUBBASE GRANULAR MATERIAL, 12"
- (H) HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- (I) TEMPORARY PAVEMENT
- (J) SUBBASE GRANULAR MATERIAL, 4"
- (K) AGGREGATE SUBGRADE 12"
- (L) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- (M) SUBBASE GRANULAR MATERIAL, 8"
- (N) CONCRETE MEDIAN SURFACE
- (O) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- (P) AGGREGATE SURFACE COURSE
- (Q) HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- (R) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

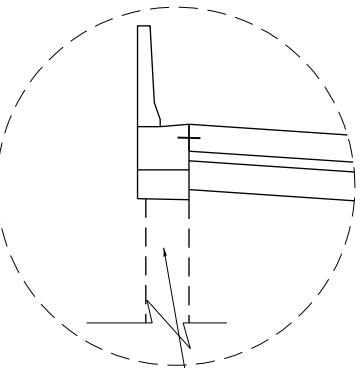
PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- (3) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (4) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (5) SUBBASE GRANULAR MATERIAL, TYPE C 4"
- (6) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- (7) CONCRETE BARRIER BASE
- (8) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- (9) PIPE UNDERDRAINS, TYPE 2, 6"
- (10) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- (11) CONCRETE GUTTER TYPE A
- (12) ITEM NOT USED
- (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- (14) ITEM NOT USED
- (15) ITEM NOT USED
- (16) ITEM NOT USED
- (17) ITEM NOT USED
- (18) ITEM NOT USED
- (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- (20) ITEM NOT USED
- (21) CONCRETE MEDIAN SURFACE, 4"
- (22) ITEM NOT USED
- (23) ITEM NOT USED
- (24) CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- (25) CONCRETE BARRIER BASE (SPECIAL NO. 1)
- (26) CONCRETE CURB, TYPE B
- (27) PORTLAND CEMENT CONCRETE PAVEMENT 8"
- (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- (29) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

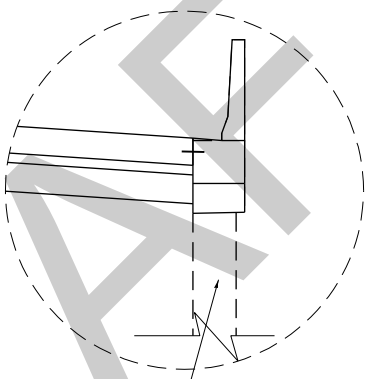
- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
- 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES



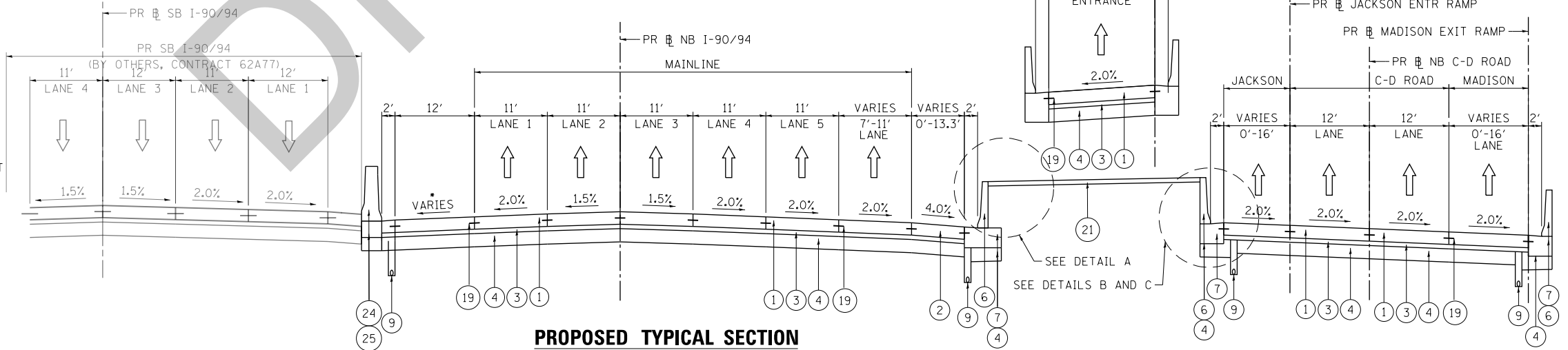
DETAIL A

RETAINING WALL FROM
STA 6152+82.14 TO STA 6153+48.99



DETAIL B

RETAINING WALL FROM
STA 6152+81.27 TO STA 6154+02.57



**PROPOSED TYPICAL SECTION
(LOOKING NORTH)**

PR NB I-90/94
STA 6150+49.69 TO STA 6156+67.37



D162A76-shr-Typical-01.dgn
USER NAME = jrmiller
PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - MKW
DRAWN - TTP
CHECKED - JMG
DATE - 6/21/19

REVISED -
REVISED -
REVISED -
REVISED -

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

**TYPICAL SECTIONS
I-90/94**

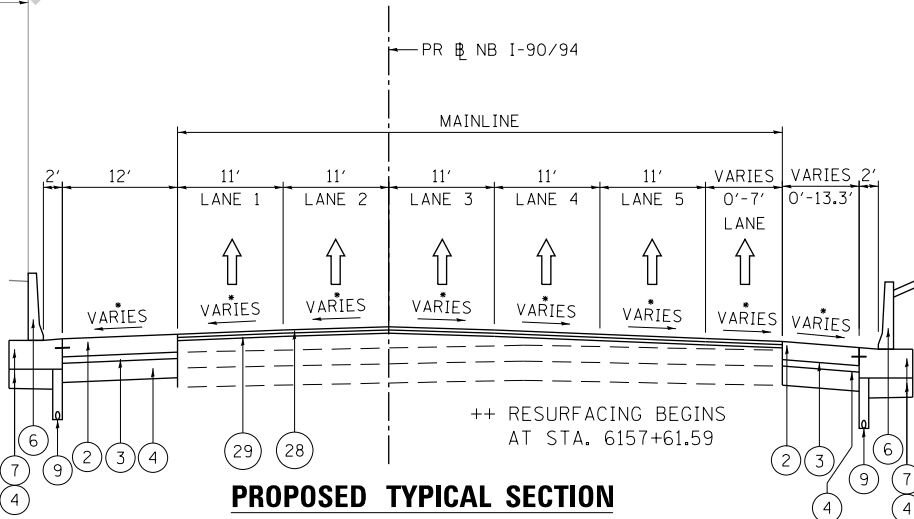
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F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-019R	COOK	1255	38
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				



- ## NOTES:

- SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

PR 8 I-90/94
43.99 TO STA 6163+97.95

PR B NB I-90/94
STA 6156+67.37 TO STA 6160+06.86



- | | |
|---|--|
| A | CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13" |
| B | STABILIZED SUBBASE, 4" |
| C | POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36" |
| D | HOT-MIX ASPHALT PAVEMENT, 3" TO 7" |
| E | CONCRETE BARRIER |
| F | CONCRETE BARRIER BASE |
| G | SUBBASE GRANULAR MATERIAL, 12" |
| H | HOT-MIX ASPHALT SHOULDERS, 10" TO 13" |
| I | TEMPORARY PAVEMENT |
| J | SUBBASE GRANULAR MATERIAL, 4" |
| K | AGGREGATE SUBGRADE 12" |
| L | PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10" |
| M | SUBBASE GRANULAR MATERIAL, 8" |
| N | CONCRETE MEDIAN SURFACE |
| O | PORTLAND CEMENT CONCRETE SHOULDERS, 11" |
| P | AGGREGATE SURFACE COURSE |
| Q | HOT-MIX ASPHALT MEDIAN SURFACE, 4" |
| R | COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6,24 |
| S | GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH) |

	D162A76-shr-Typical-01.dgn	DESIGNED MKW	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	TYPICAL SECTIONS I-90/94				F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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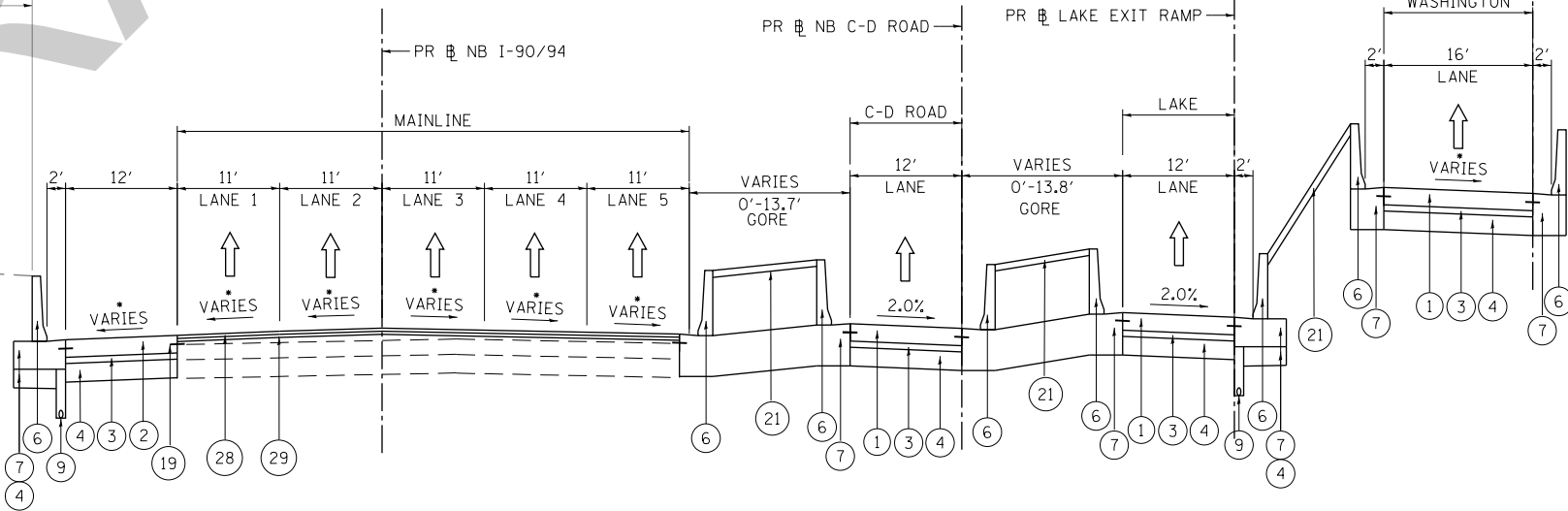
- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- (B) STABILIZED SUBBASE, 4"
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- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

- ① PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- ② PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
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- ④ AGGREGATE SUBGRADE IMPROVEMENT 12"
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- ⑦ CONCRETE BARRIER BASE
- ⑧ TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING,
(SEE EROSION CONTROL PLANS)
- ⑨ PIPE UNDERDRAINS, TYPE 2, 6"
- ⑩ TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- ⑪ CONCRETE GUTTER TYPE A
- ⑫ ITEM NOT USED
- ⑬ COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- ⑭ ITEM NOT USED
- ⑮ ITEM NOT USED
- ⑯ ITEM NOT USED
- ⑰ ITEM NOT USED
- ⑱ ITEM NOT USED
- ⑲ TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR
PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS
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- ⑳ ITEM NOT USED
- ㉑ CONCRETE MEDIAN SURFACE, 4"
- ㉒ ITEM NOT USED
- ㉓ ITEM NOT USED
- ㉔ CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- ㉕ CONCRETE BARRIER BASE (SPECIAL NO. 1)
- ㉖ CONCRETE CURB, TYPE B
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STONE MATRIX ASPHALT, 12.5 N80 2"
- ㉙ POLYMERIZED HOT-MIX ASPHALT BINDER COURSE,
STONE MATRIX ASPHALT, 12.5 N80 2"

1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

PR ~~B~~ I-90/94
STA 6163+97.95 TO STA 6166+31.75



PR B NB I-90/94
STA 6160+06.86 TO STA 6164+05.78

	D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	TYPICAL SECTIONS I-90/94					F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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- PROPOSED**
- 1 PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
 - 2 PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
 - 3 STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
 - 4 AGGREGATE SUBGRADE IMPROVEMENT 12"
 - 5 SUBBASE GRANULAR MATERIAL, TYPE C 4"
 - 6 CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
 - 7 CONCRETE BARRIER BASE
 - 8 TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
 - 9 PIPE UNDERDRAINS, TYPE 2, 6"
 - 10 TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
 - 11 CONCRETE GUTTER TYPE A
 - 12 ITEM NOT USED
 - 13 COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
 - 14 ITEM NOT USED
 - 15 ITEM NOT USED
 - 16 ITEM NOT USED
 - 17 ITEM NOT USED
 - 18 ITEM NOT USED
 - 19 TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
 - 20 ITEM NOT USED
 - 21 CONCRETE MEDIAN SURFACE, 4"
 - 22 ITEM NOT USED
 - 23 ITEM NOT USED
 - 24 CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
 - 25 CONCRETE BARRIER BASE (SPECIAL NO. 1)
 - 26 CONCRETE CURB, TYPE B
 - 27 PORTLAND CEMENT CONCRETE PAVEMENT 8"
 - 28 POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
 - 29 POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

- NOTES:**
- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
 - 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
 - 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

**EXISTING TYPICAL SECTION
(LOOKING NORTH)**

PR # I-90/94
STA 6170+39.66 TO STA 6175+07.63

- EXISTING**
- A CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
 - B STABILIZED SUBBASE, 4"
 - C POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
 - D HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
 - E CONCRETE BARRIER
 - F CONCRETE BARRIER BASE
 - G SUBBASE GRANULAR MATERIAL, 12"
 - H HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
 - I TEMPORARY PAVEMENT
 - J SUBBASE GRANULAR MATERIAL, 4"
 - K AGGREGATE SUBGRADE 12"
 - L PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
 - M SUBBASE GRANULAR MATERIAL, 8"
 - N CONCRETE MEDIAN SURFACE
 - O PORTLAND CEMENT CONCRETE SHOULDERS, 11"
 - P AGGREGATE SURFACE COURSE
 - Q HOT-MIX ASPHALT MEDIAN SURFACE, 4"
 - R COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
 - S GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)



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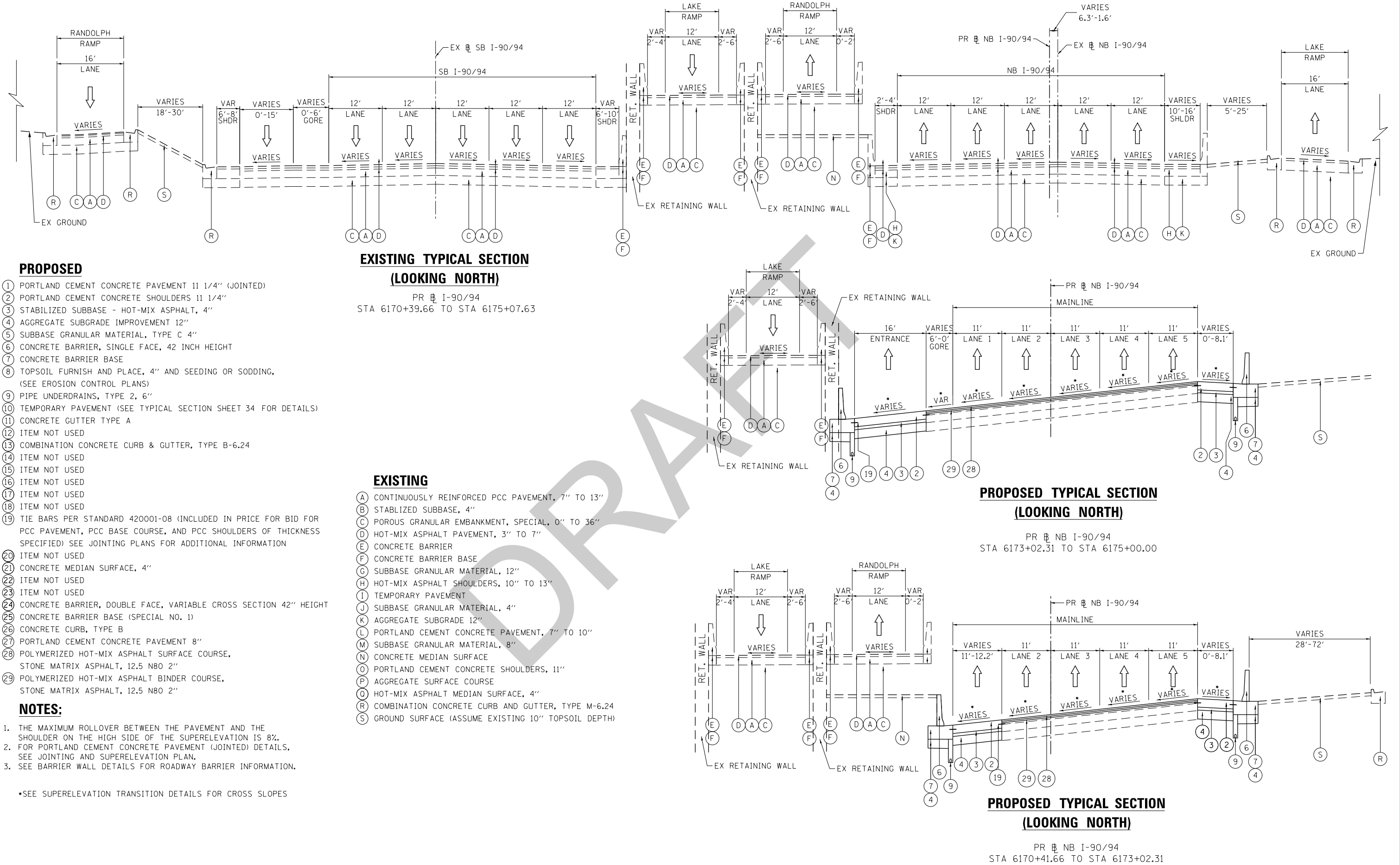
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DRAWN - TTP	REVISED -
CHECKED - JMG	REVISED -
DATE - 6/21/19	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

**TYPICAL SECTIONS
I-90/94**

SCALE: NONE SHEET 16 OF 17 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-019R	COOK	1255	42
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				



SCOPE OF WORK
Jane Byrne Interchange (I-90/94 and I-290/Congress Parkway)

Contract 62A77
SB I-90/94 from Roosevelt Rd to Lake St/Madison St
Section 2015-018R
Job Number C-91-311-15
PTB 163-001

July 2, 2019

This improvement consists of the construction of Southbound I-90/94 mainline from Roosevelt Road to Madison Street. It also includes construction of the following ramps: Southbound I-90/94 Madison Street Entrance Ramp, Southbound I-90/94 Exit Ramp to Jackson Boulevard, Southbound I-90/94 Exit Ramp to Adams Street, Ramp East to South (ES), Ramp West to South (WS), and Ramp South to West (SW) where it is combined with Ramp South to East (SE) and the Southbound I-90/94 Exit Ramp to Taylor Street. This work also includes the construction of Retaining Wall 34 (SN 016-1823) as well as modifications to existing Retaining Wall 5 (SN 016-1164) and existing Retaining Wall 50 (SN 016-1189).

The length of improvement is approximately 8,815 ft. The work includes mainline pavement reconstruction, ramp pavement reconstruction, pavement resurfacing, pavement widening, Accident Investigation Site reconstruction, retaining wall construction, retaining wall modifications, drainage, detention storage tank construction, details around utilities and water tunnels, signing, traffic control and protection, lighting, ITS installation, landscaping, urban enhancements and pavement markings.

Pavement resurfacing is proposed in the following location:

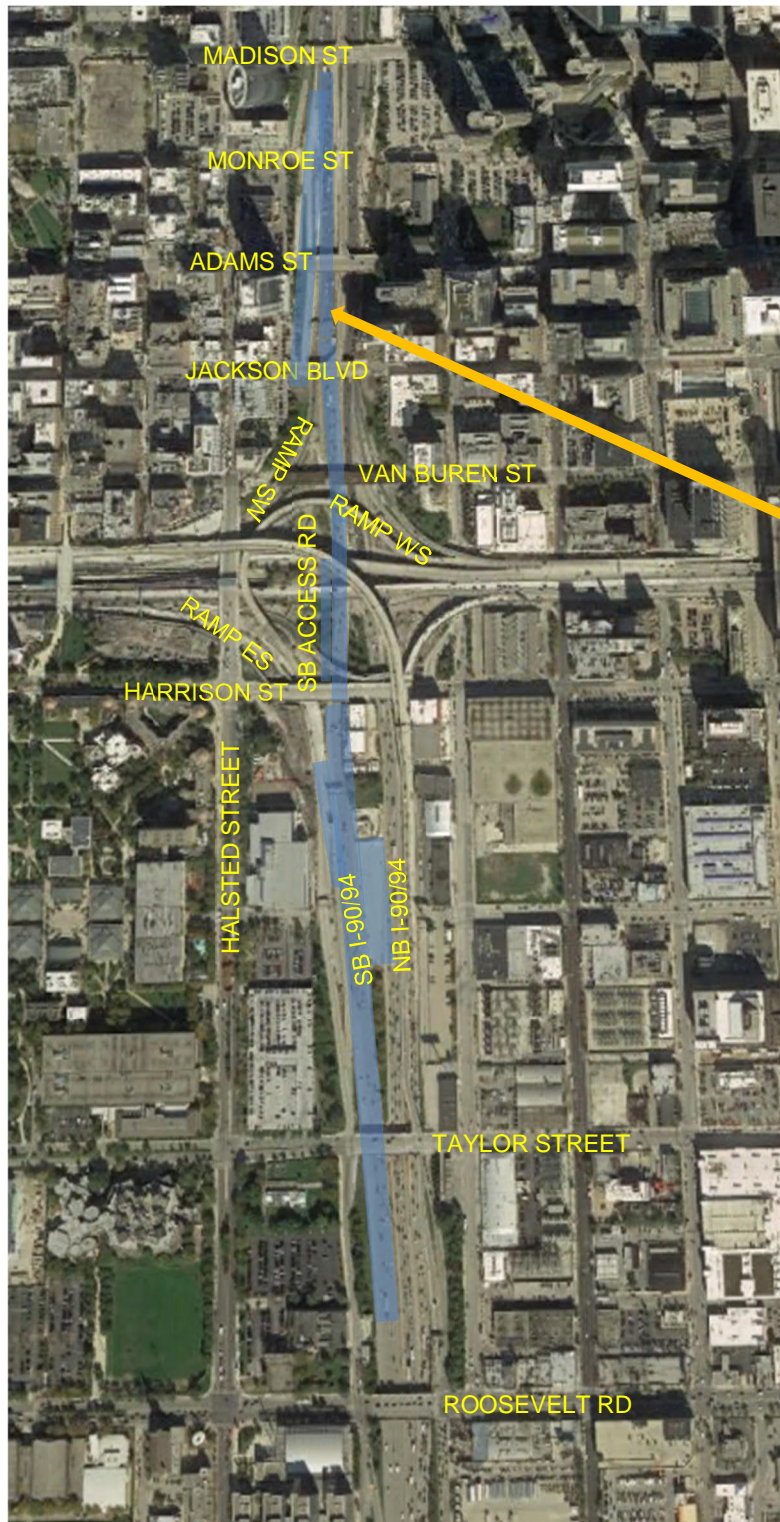
- Southbound I-90/94 south of Madison Street to tie into existing pavement

Proposed final pavement will be constructed at the following locations:

- Southbound I-90/94 between Madison Street and Roosevelt Road
- Southbound I-90/94 Madison Street Entrance Ramp bridge approach to Southbound I-90/94 merge
- Ramp SW from Southbound I-90/94 to the Ramp SE and SB Taylor Exit Ramp split
- Southbound I-90/94 Access Road
- Ramp ES where it merges with Southbound I-90/94
- Ramp WS where it merges with Southbound I-90/94
- Accident Investigation Site between the Southbound and Northbound I-90/94 mainlines

Pavement widening is proposed in the following location:

- Southbound I-90/94 north of Roosevelt Road to adjust the lane configuration to tie into existing



PROJECT LOCATION

PROJECT LOCATION MAP

CONTRACT 62A77

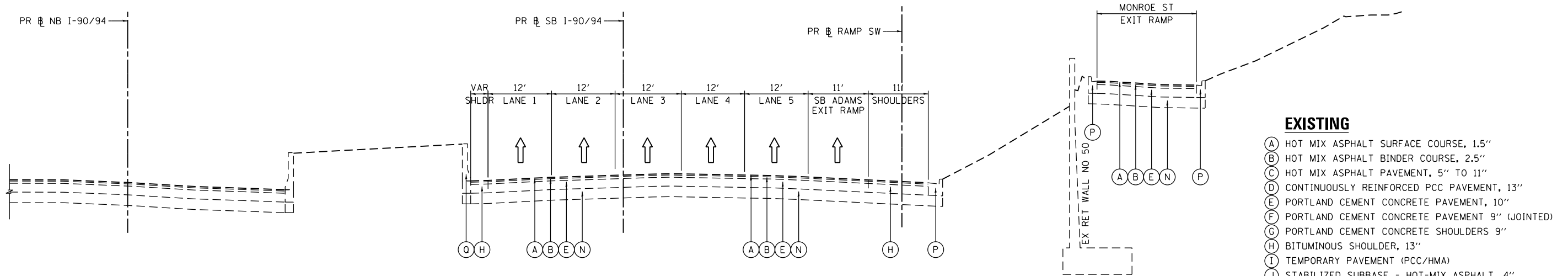
SB I-90/94 from Roosevelt Rd to Lake St/Madison St

SECTION 2015-018R

C-91-311-15

NOT TO SCALE

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EXISTING TYPICAL SECTION

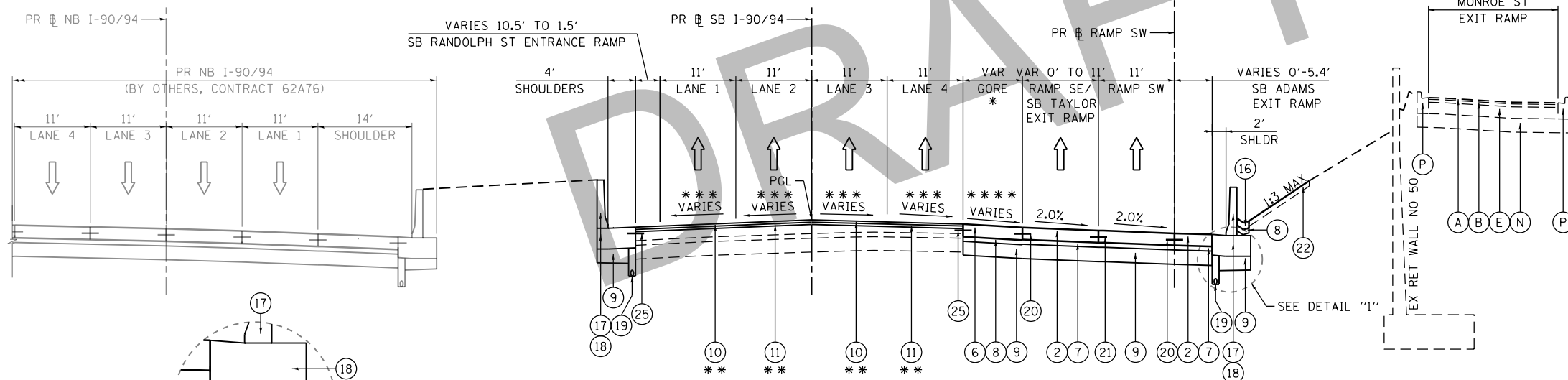
SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6201+18.73 TO STA 6204+00.00

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)



PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6201+18.73 TO STA 6204+00.00

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B

NOTES:

- THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

* GORE VARIES FROM 1' TO 8.6'
STA 6202+91.11 TO STA 6204+00.00
(PR SB I-90/94)

** STA 6202+91.11 TO STA 6204+00.00
(PR SB I-90/94)

*** SEE SUPERELEVATION DETAILS SHEET 101

**** SEE GORE GRADING SHEET 122



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PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

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DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

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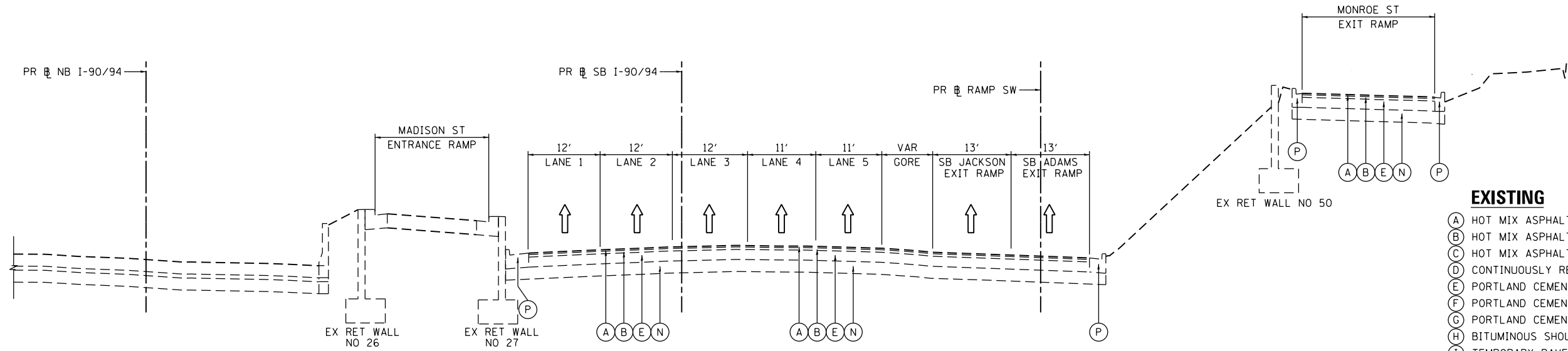
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 1 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	33
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

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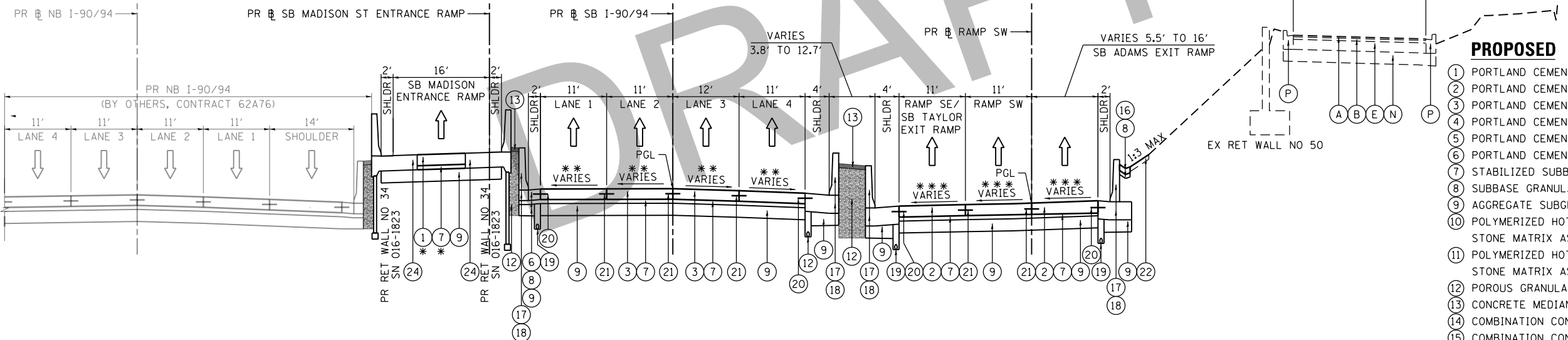
EXISTING TYPICAL SECTION

**SB I-90/94
(LOOKING SOUTH)**

PR SB I-90/94
STA 6204+00.00 TO STA 6206+64.78

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)



PROPOSED TYPICAL SECTION

**SB I-90/94
(LOOKING SOUTH)**

PR SB I-90/94
STA 6204+00.00 TO STA 6206+64.78

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

* APPROACH SLAB STA 8562+04.40 TO STA 8562+34.40
PAVEMENT CONNECTOR (PCC) FOR BRIDGE APPROACH SLAB
STA 8562+34.40 TO STA 8562+49.40
(PR SB MADISON ST ENTRANCE RAMP)

** SEE SUPERELEVATION DETAILS SHEET 101

*** SEE SUPERELEVATION DETAILS SHEET 109



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PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/19/2019

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DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

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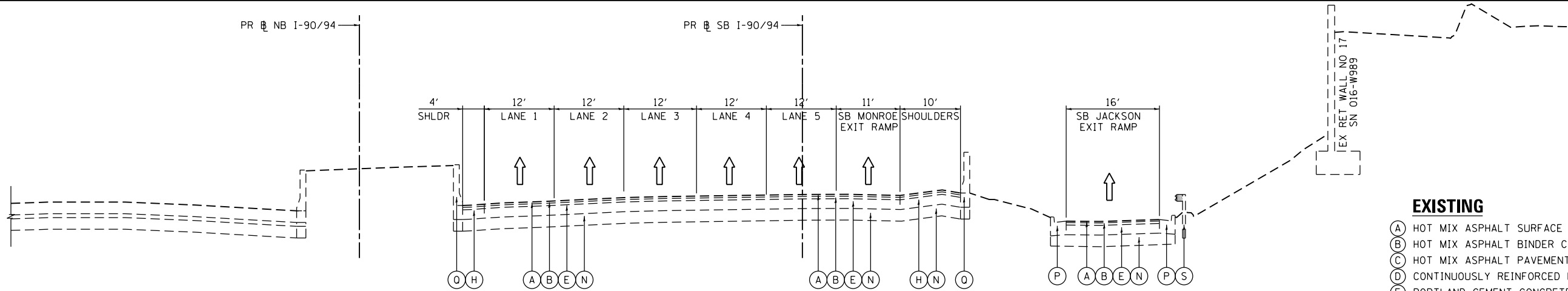
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 2 OF 14 SHEETS STA. TO STA.

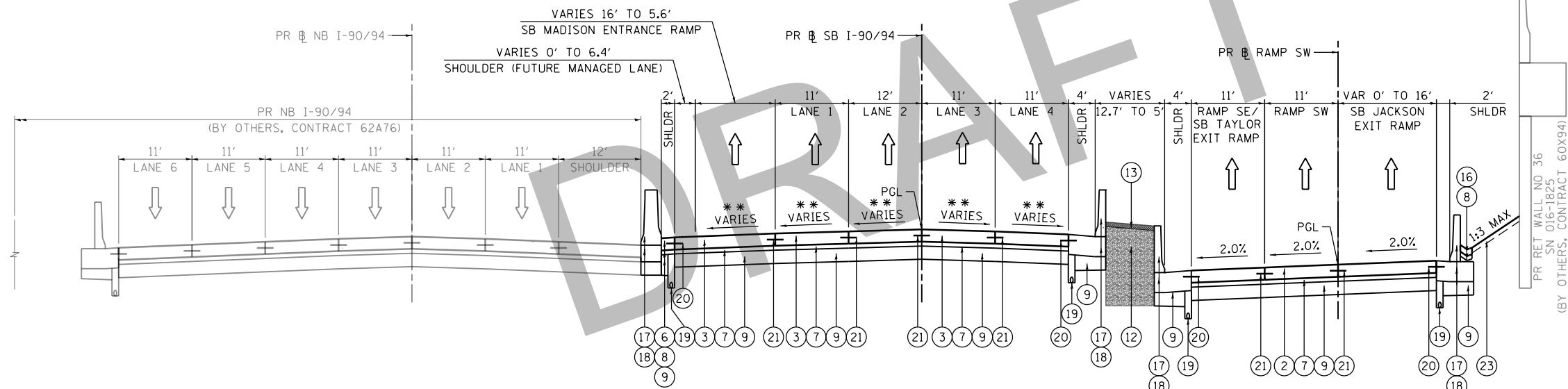
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	34
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

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EXISTING TYPICAL SECTION
SB I-90/94
(LOOKING SOUTH)

PR SB I-90/94
STA 6206+64.78 TO STA 6212+15.64



PROPOSED TYPICAL SECTION
SB I-90/94
(LOOKING SOUTH)

PR SB I-90/94
STA 6206+64.78 TO STA 6212+15.64

** SEE SUPERELEVATION DETAILS SHEET 102

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B



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PLOT DATE = 6/18/2019

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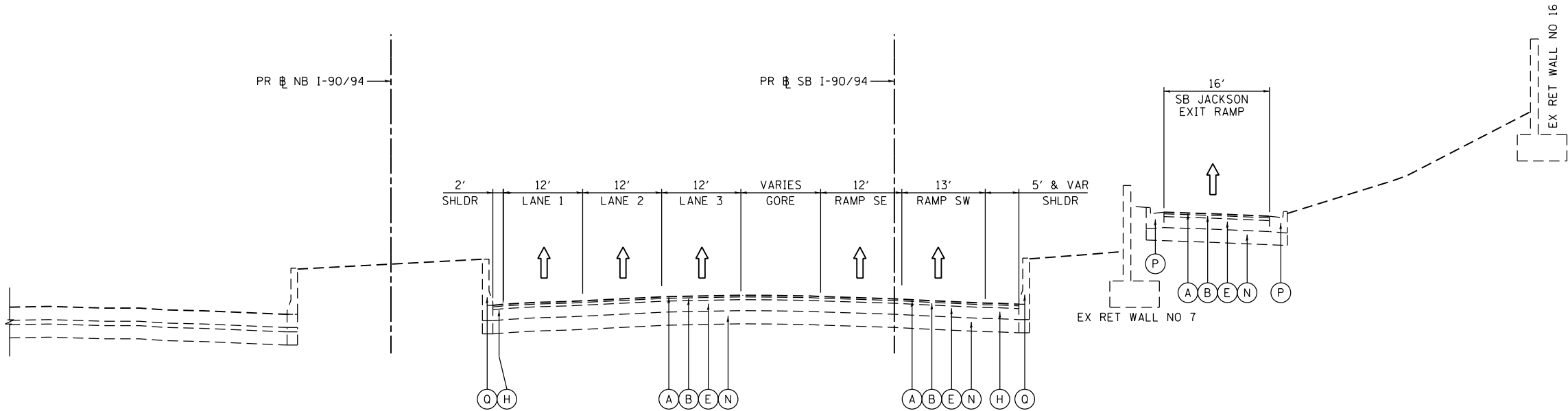
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 3 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	35
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

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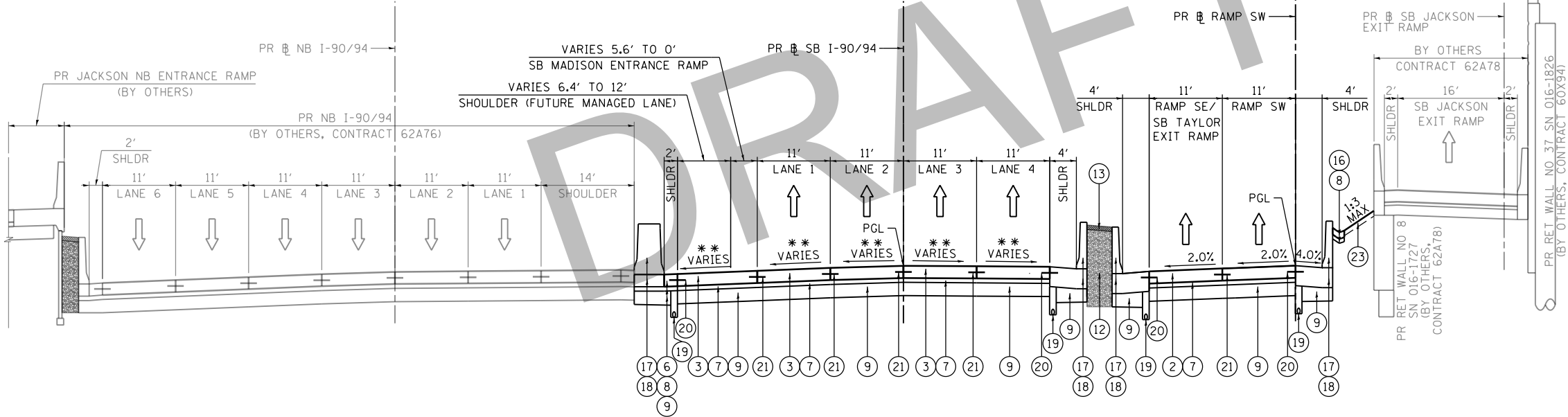


EXISTING TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

EX SB I-90/94
STA 6212+15.64 TO STA 6216+52.70



PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6212+15.64 TO STA 6216+52.70

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

** SEE SUPERELEVATION DETAILS SHEET 103

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B



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PLOT DATE = 6/18/2019

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CHECKED - MJE
DATE - 6/21/2019

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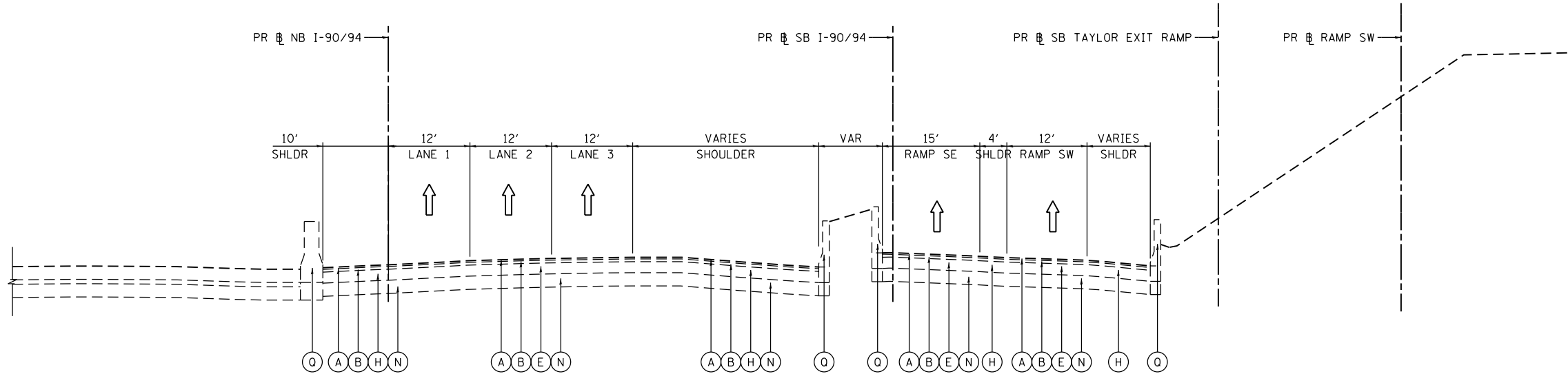
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 4 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	36
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

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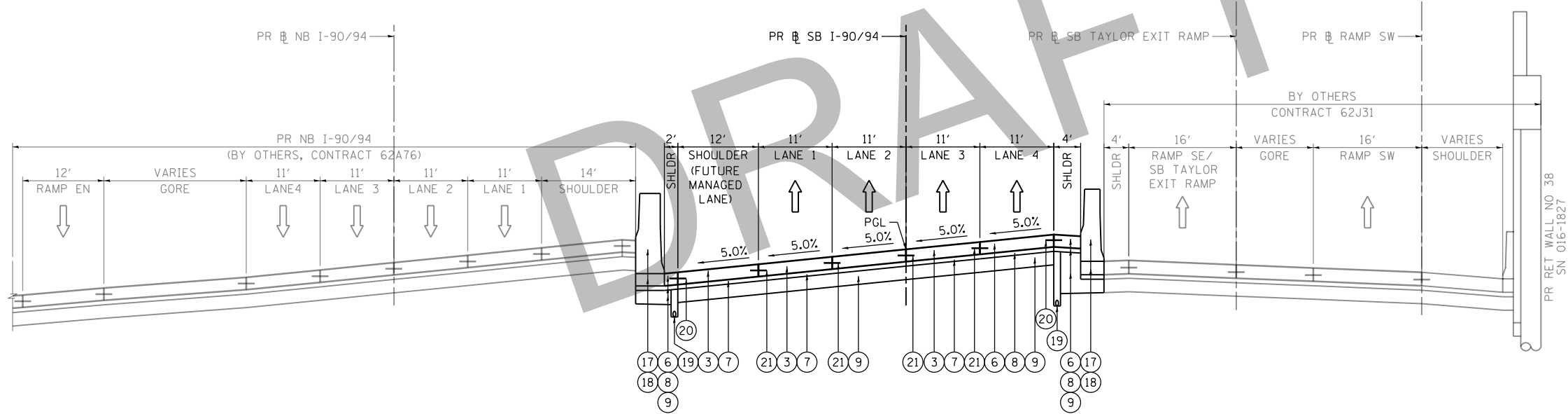


EXISTING TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6216+52.70 TO STA 6218+37.53



PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6216+52.70 TO STA 6218+37.53

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B



D162A77-SHT-Typical-05.dgn
USER NAME = dshevoZ
PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - OPS
DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

REVISED -
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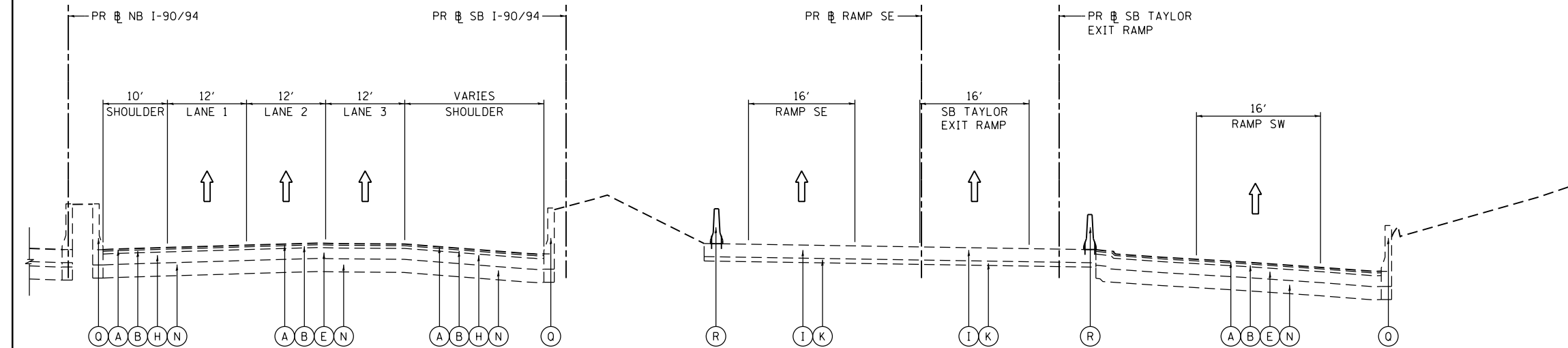
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 5 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	37
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

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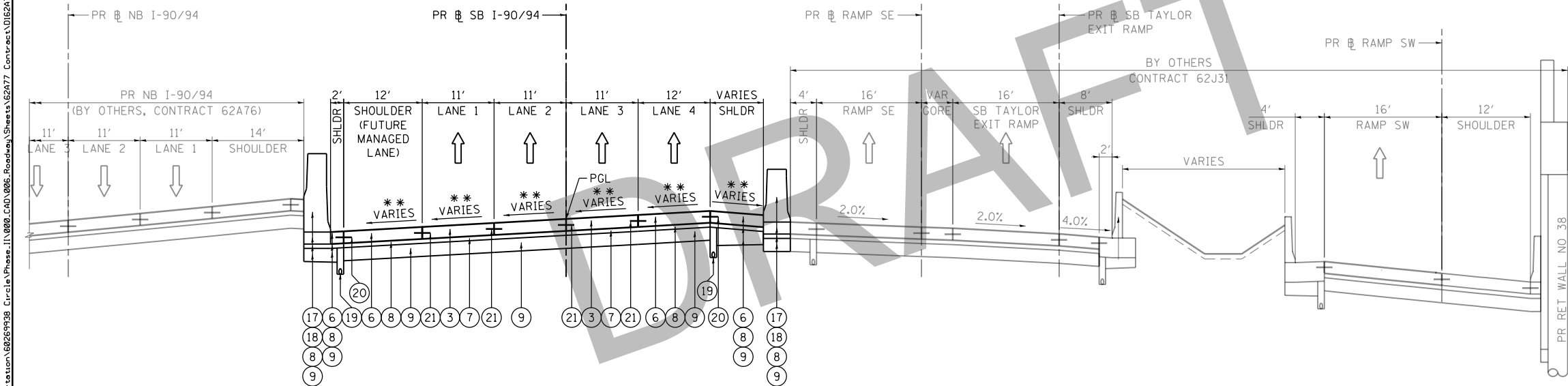


EXISTING TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6218+37.53 TO STA 6220+47.18



PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6218+37.53 TO STA 6220+47.18

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

** SEE SUPERELEVATION DETAILS SHEET 104

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B



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PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

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DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

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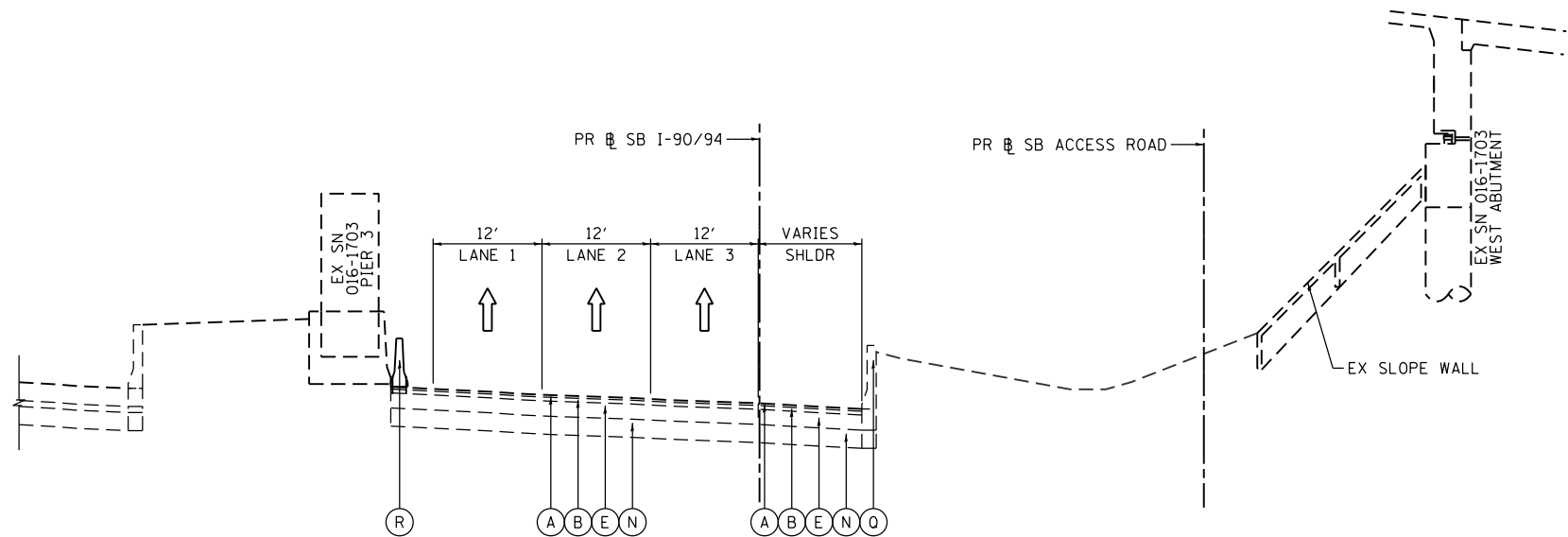
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 6 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	38
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

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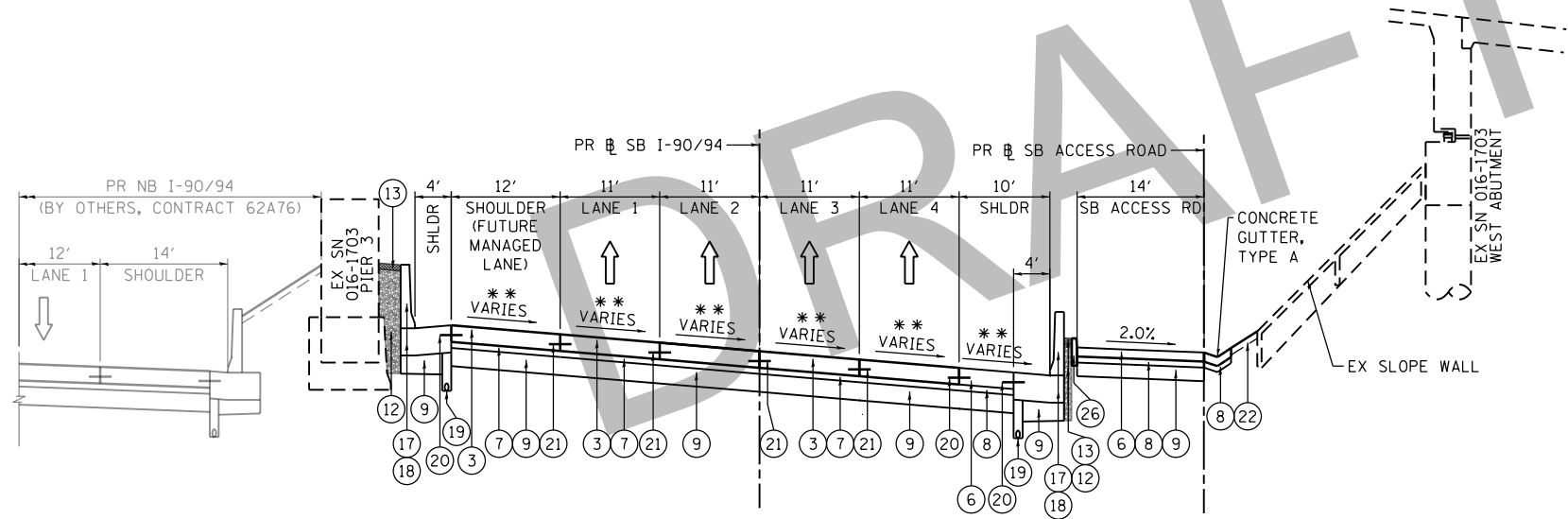


EXISTING TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6220+47.18 TO STA 6229+11.25



PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6220+47.18 TO STA 6229+11.25

** SEE SUPERELEVATION DETAILS SHEET 104 AND 105

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B



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PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

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DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

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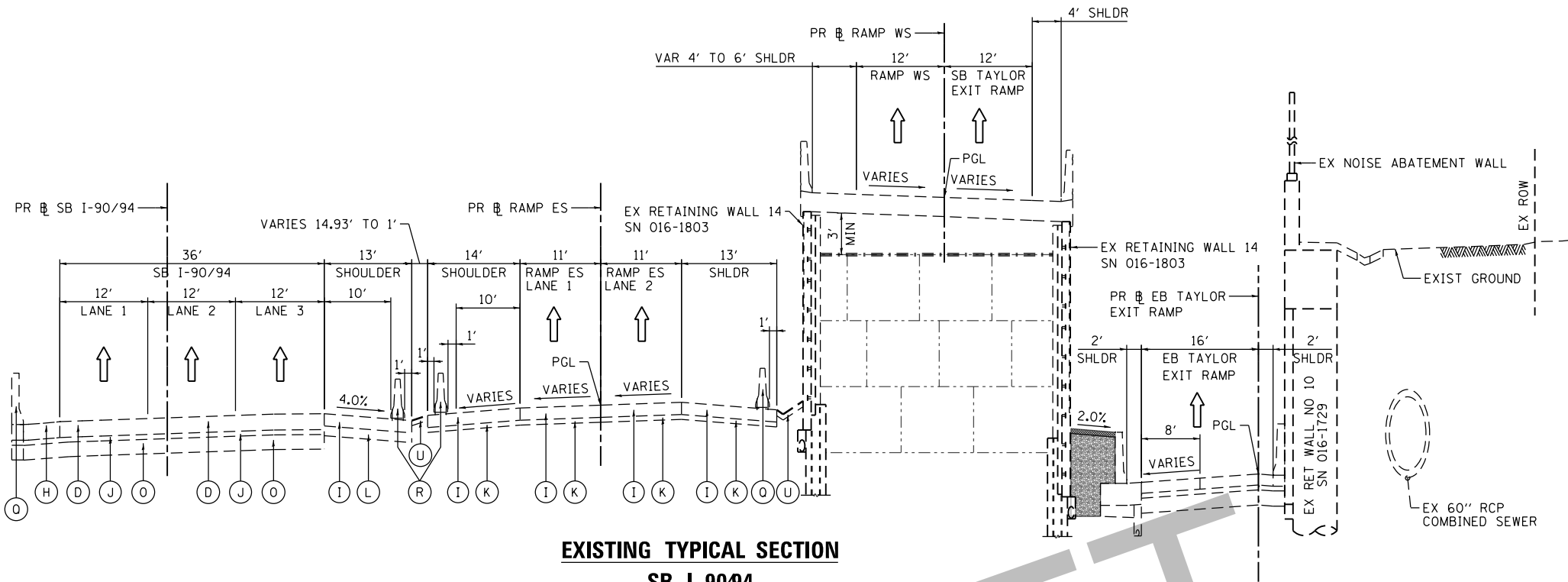
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 7 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	39
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

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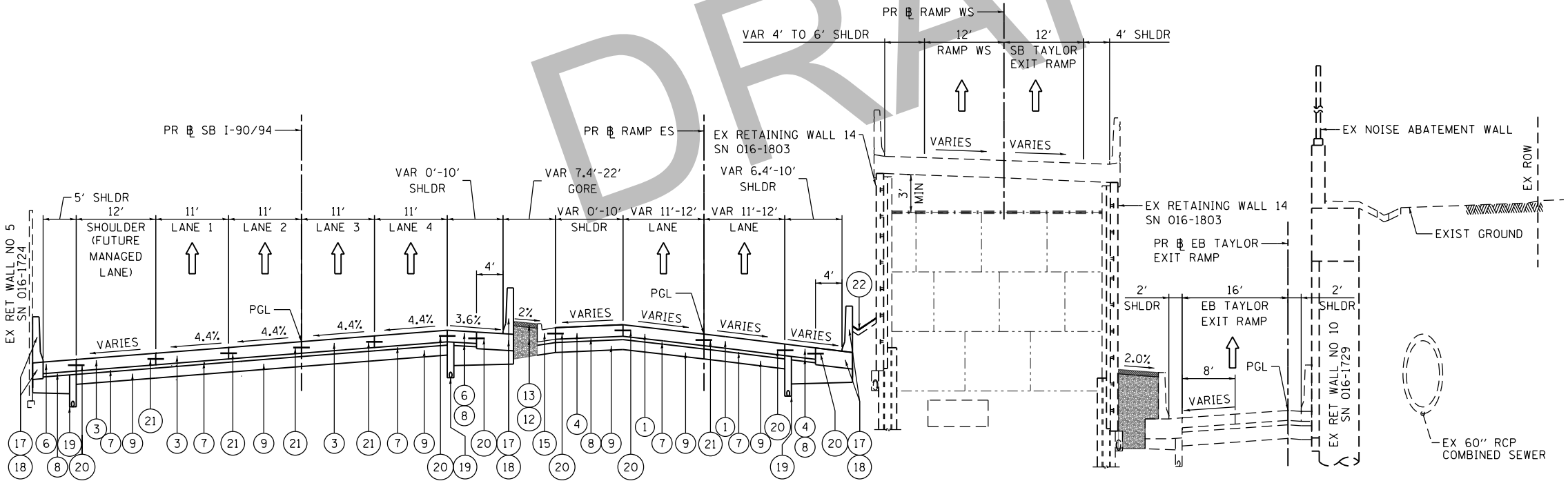
SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6229+11.25 TO STA 6232+50.00

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)



NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6229+11.25 TO STA 6232+50.00

PROPOSED

- 1 PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- 2 PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- 3 PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- 4 PORTLAND CEMENT CONCRETE SHOULDERS 9"
- 5 PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- 6 PORTLAND CEMENT CONCRETE SHOULDERS 11"
- 7 STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- 8 SUBBASE GRANULAR MATERIAL, TYPE B 4"
- 9 AGGREGATE SUBGRADE IMPROVEMENT 12"
- 10 POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- 11 POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- 12 POROUS GRANULAR EMBANKMENT
- 13 CONCRETE MEDIAN SURFACE, 4"
- 14 COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- 15 COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- 16 CONCRETE GUTTER, TYPE B
- 17 CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- 18 CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- 19 PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- 20 #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- 21 #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- 22 TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- 23 TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- 24 ANCHOR SLAB (SEE STRUCTURAL PLANS)
- 25 DRILL AND GROUT #8 TIE BARS
- 26 CONCRETE CURB, TYPE B



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PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - OPS
DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

REVISED -
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REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

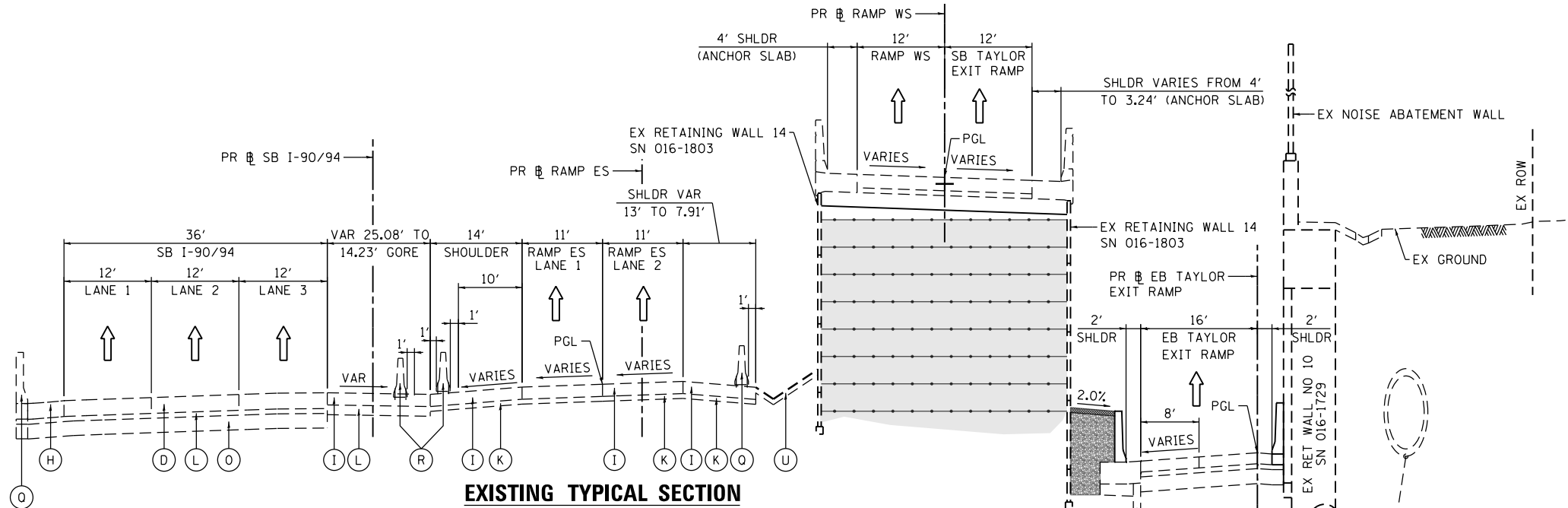
SCALE: NONE SHEET 8 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	40
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

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EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)



EXISTING TYPICAL SECTION

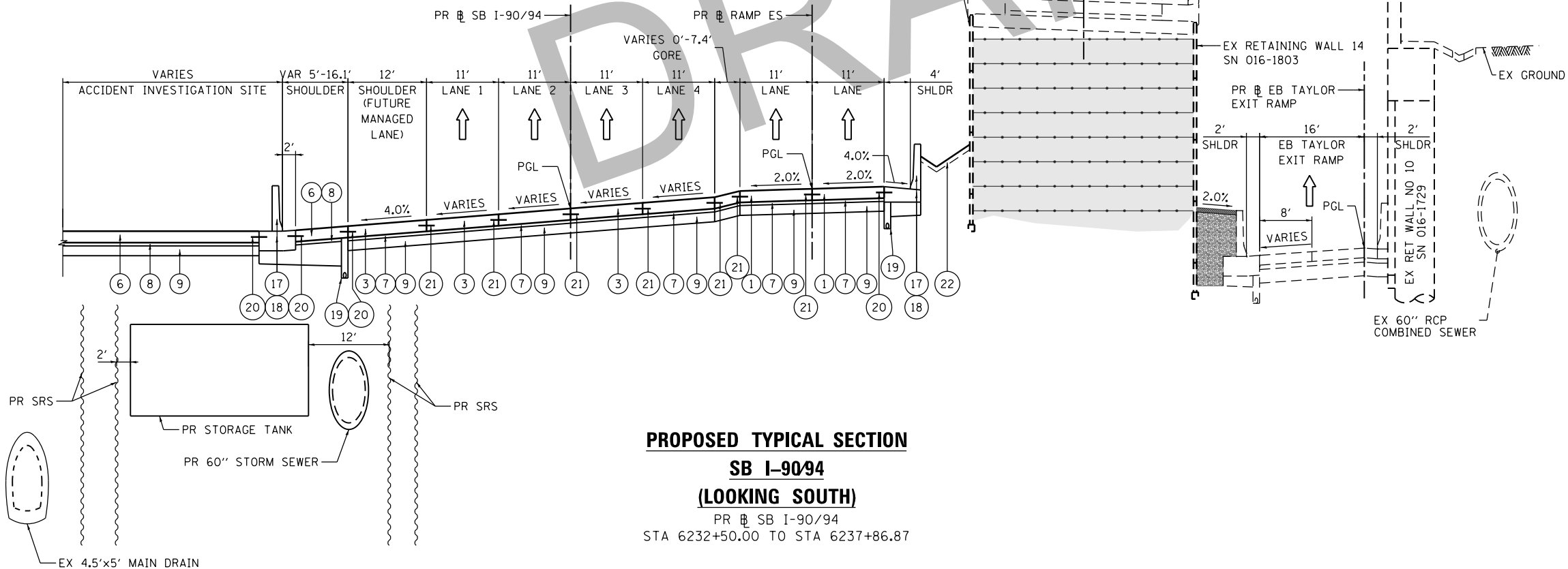
SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6232+50.00 TO STA 6237+86.87

NOTES:

- THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.



PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6232+50.00 TO STA 6237+86.87

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B



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PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - OPS
DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

REVISED -
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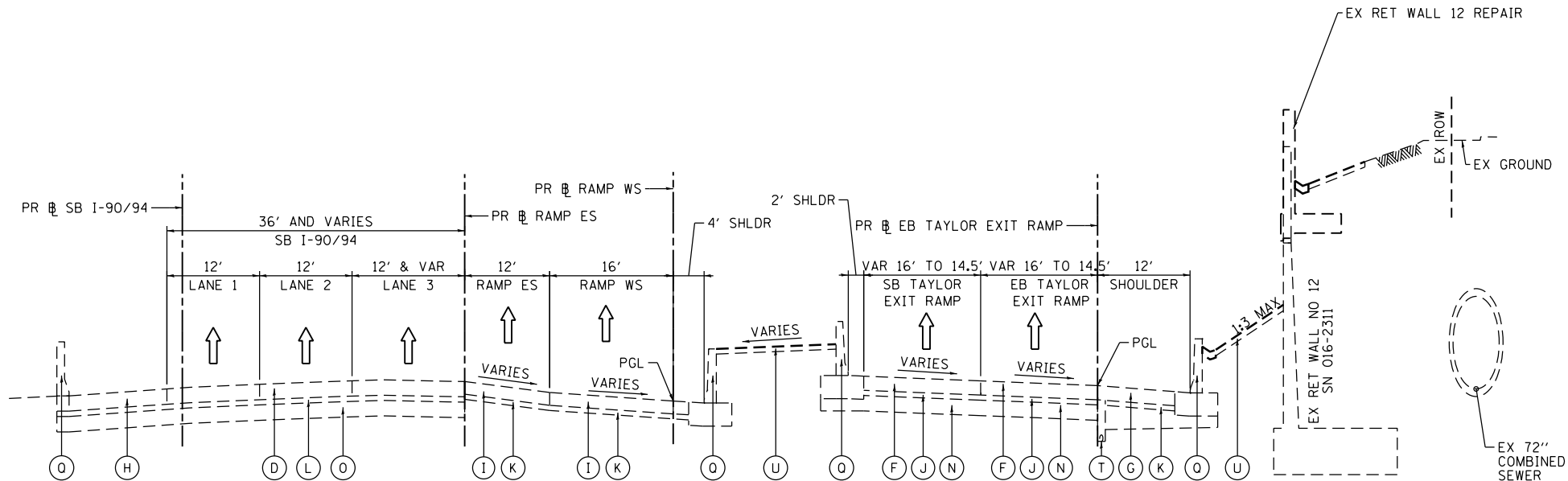
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 9 OF 14 SHEETS STA. TO STA.

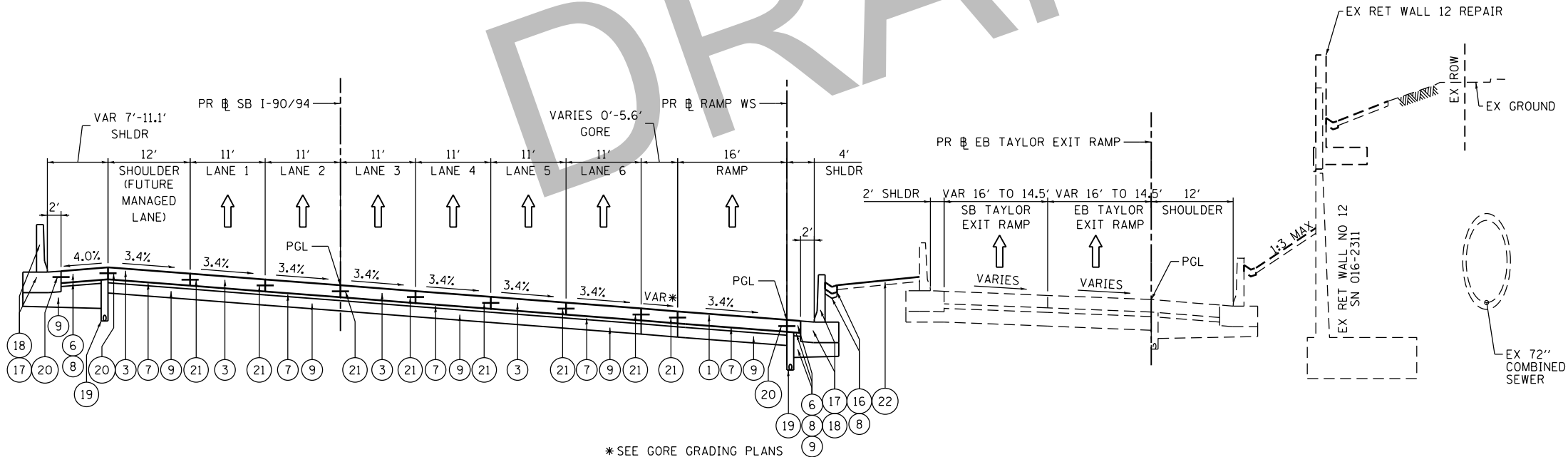
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	41
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

FILE PATH = p:\V\AECOM\NA-ANSI\ecmonline\local\AECOM\DS02_NA\Documents\01_Americas\Transportation\60269938_Circle Phase II\000 CAD\006_Roadway\Sheets\62A77-SHT-Typical-10.dgn



EXISTING TYPICAL SECTION
SB I-90/94
(LOOKING SOUTH)
PR SB I-90/94
STA 6237+86.87 TO STA 6240+68.51

- EXISTING**
- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
 - (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
 - (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
 - (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
 - (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
 - (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
 - (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
 - (H) BITUMINOUS SHOULDER, 13"
 - (I) TEMPORARY PAVEMENT (PCC/HMA)
 - (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
 - (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
 - (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
 - (M) SUBBASE GRANULAR MATERIAL, 12"
 - (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
 - (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
 - (P) COMBINATION CONCRETE CURB AND GUTTER
 - (Q) CONCRETE BARRIER
 - (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
 - (S) GUARDRAIL
 - (T) PIPE UNDERDRAINS
 - (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)



*SEE GORE GRADING PLANS

PROPOSED TYPICAL SECTION
SB I-90/94
(LOOKING SOUTH)
PR SB I-90/94
STA 6237+86.87 TO STA 6240+68.51

- PROPOSED**
- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
 - (2) PORTLAND CEMENT CONCRETE PAVEMENT 10½" (JOINTED)
 - (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
 - (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
 - (5) PORTLAND CEMENT CONCRETE SHOULDERS 10½"
 - (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
 - (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
 - (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
 - (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
 - (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
 - (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
 - (12) POROUS GRANULAR EMBANKMENT
 - (13) CONCRETE MEDIAN SURFACE, 4"
 - (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
 - (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
 - (16) CONCRETE GUTTER, TYPE B
 - (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
 - (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
 - (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
 - (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
 - (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
 - (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
 - (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
 - (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
 - (25) DRILL AND GROUT #8 TIE BARS
 - (26) CONCRETE CURB, TYPE B

NOTES:

- THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.



D162A77-SHT-Typical-10.dgn
USER NAME = dshevaZ
PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/19/2019

DESIGNED - OPS
DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

REVISED -
REVISED -
REVISED -
REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

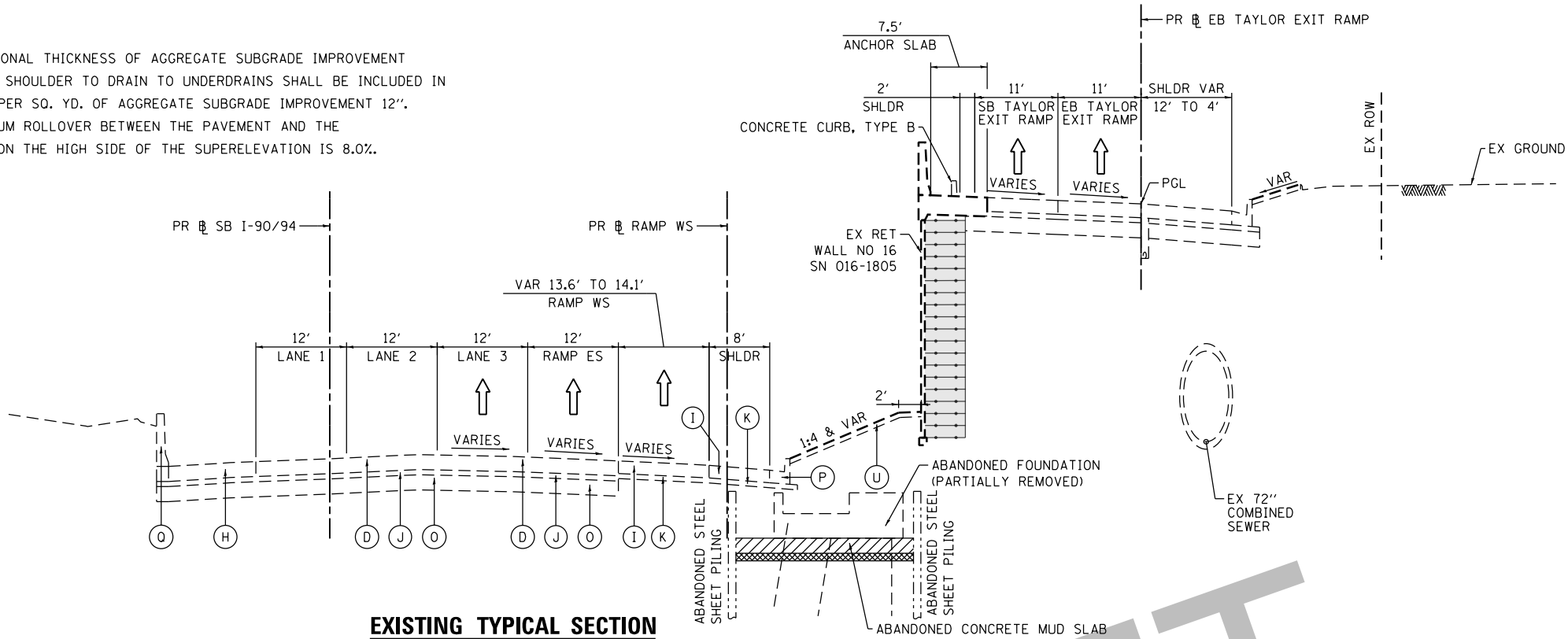
TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 10 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	42
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

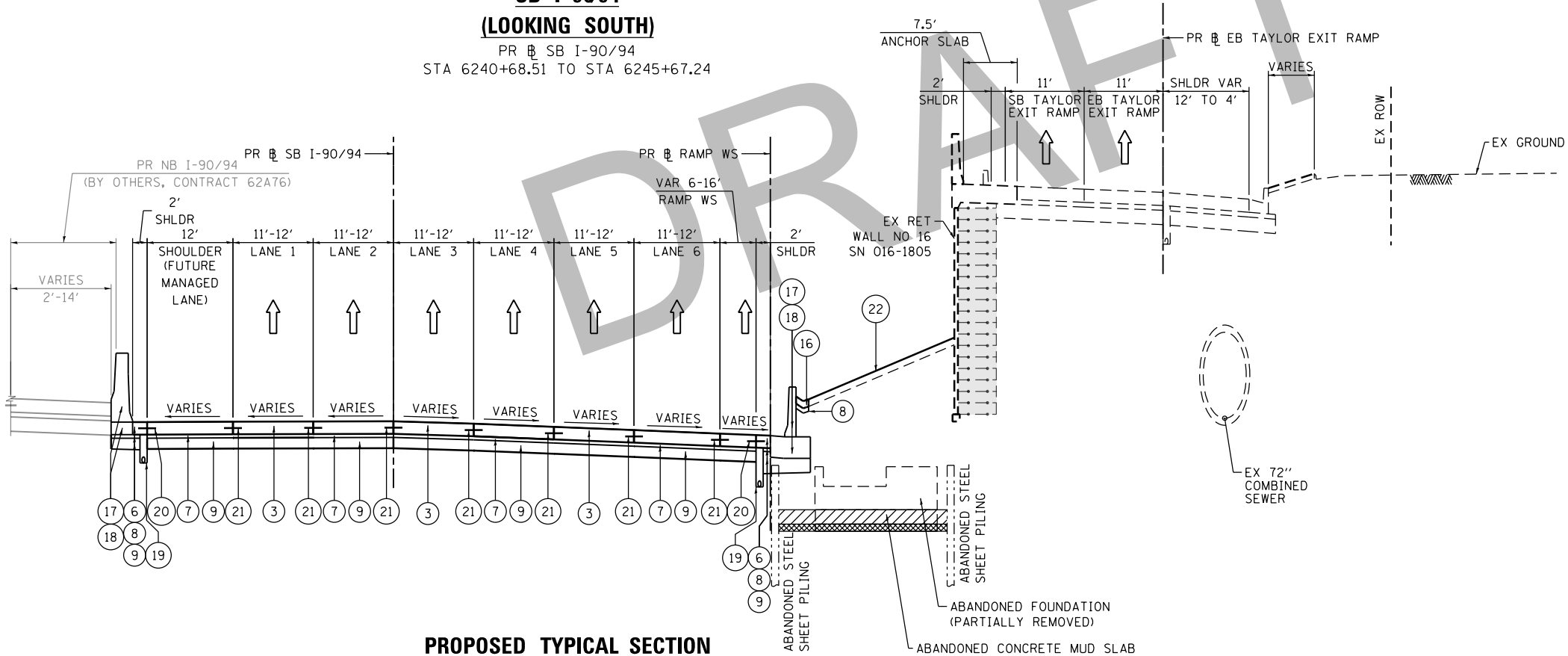


EXISTING TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6240+68.51 TO STA 6245+67.24



PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6240+68.51 TO STA 6245+67.24

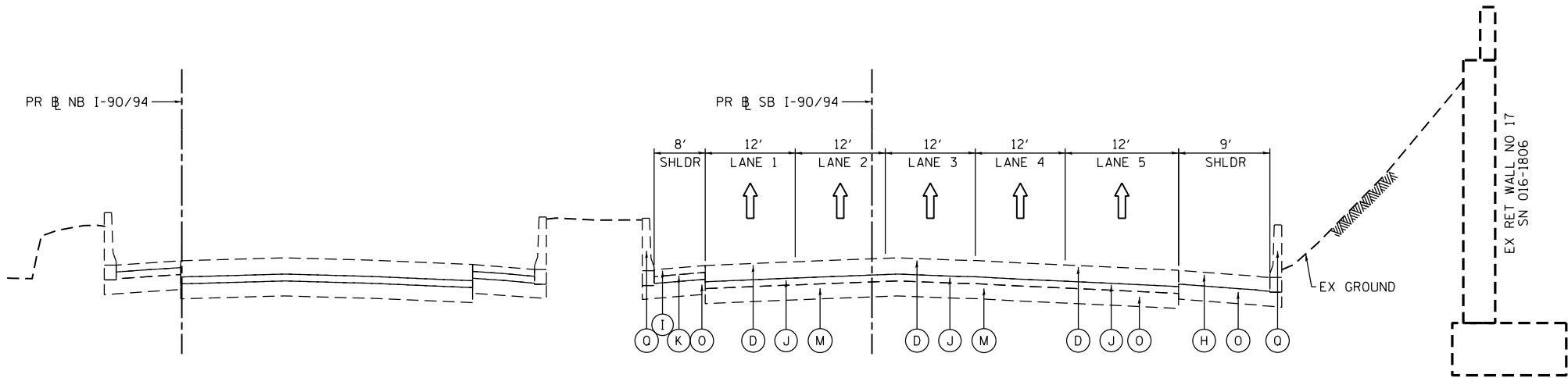
EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
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- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B

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EXISTING TYPICAL SECTION

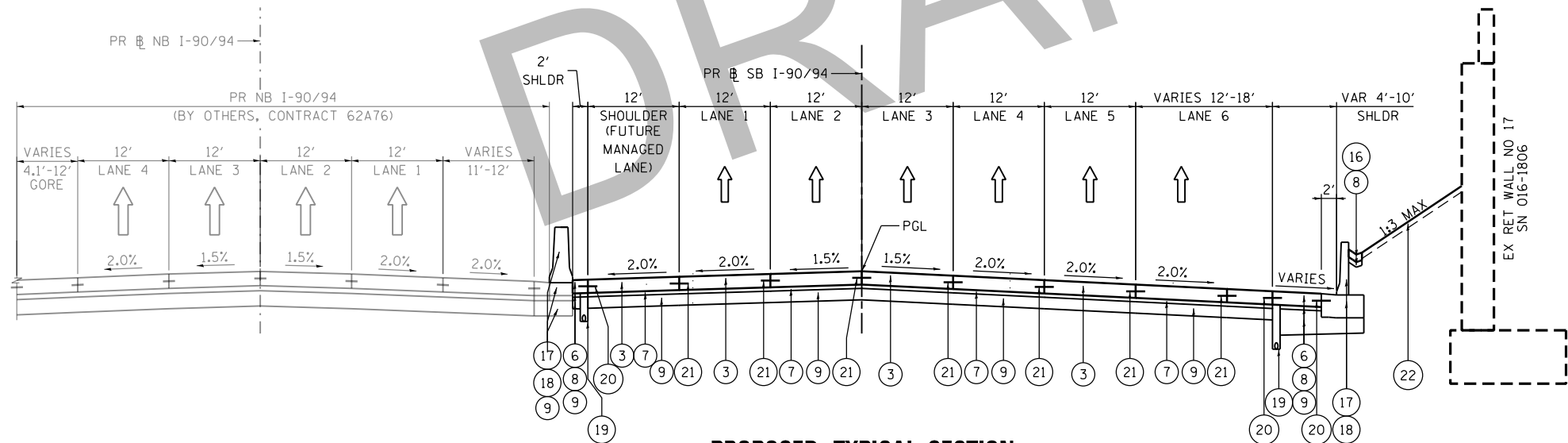
SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6245+67.24 TO STA 6248+65.35

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
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- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)



PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR SB I-90/94
STA 6245+67.24 TO STA 6248+65.35

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10 1/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B

NOTES:

1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.



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PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - OPS
DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

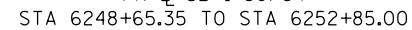
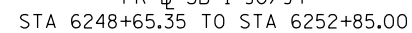
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REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

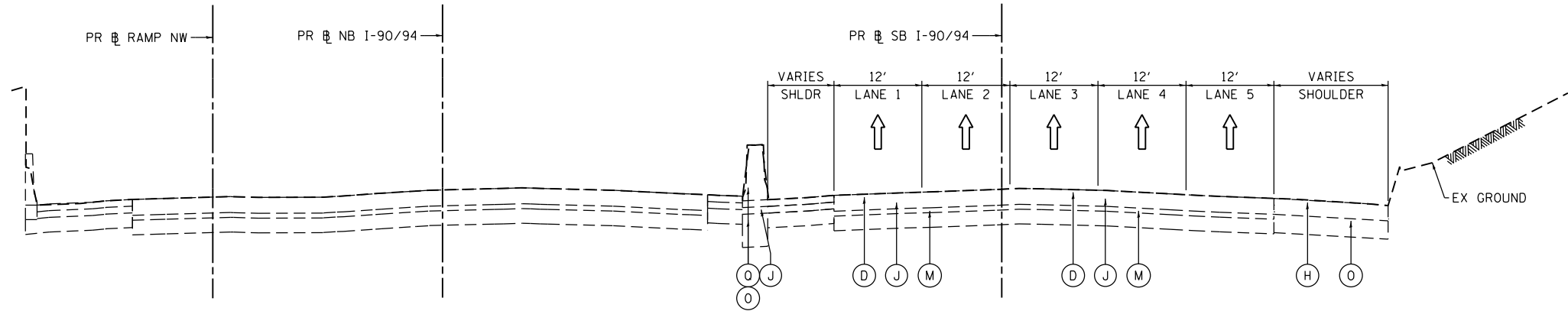
SCALE: NONE SHEET 12 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	44
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				



F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	45
		CONTRACT NO. 62A77		
ILLINOIS		FED. AID PROJECT		

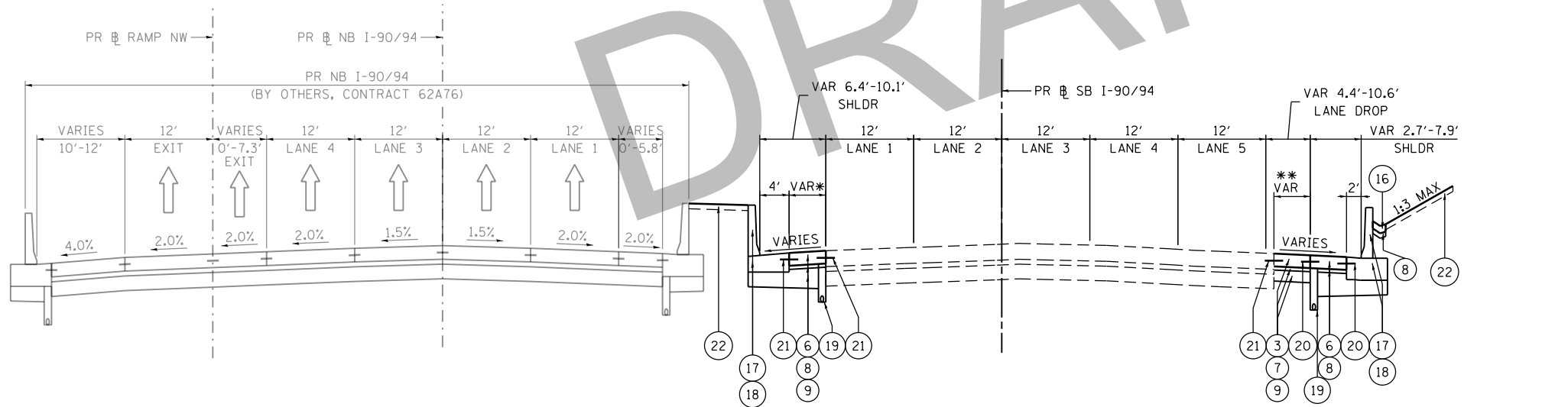
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EXISTING TYPICAL SECTION
SB I-90/94
(LOOKING SOUTH)
PR 0 SB I-90/94
STA 6252+85.00 TO STA 6256+00.00

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (O) POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- (R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- (T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)



PROPOSED TYPICAL SECTION
SB I-90/94
(LOOKING SOUTH)
PR 0 SB I-90/94
STA 6252+85.00 TO STA 6256+00.00

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT 10½" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 10½"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
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- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) *6 TIE BARS, 24" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) *6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT *8 TIE BARS
- (26) CONCRETE CURB, TYPE B

NOTES:

- 1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- 2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.



D162A77-SHT-Typical-14.dgn
USER NAME = dshevaZ
PLOT SCALE = 20.0000' / in.
PLOT DATE = 6/18/2019

DESIGNED - OPS
DRAWN - ZND
CHECKED - MJE
DATE - 6/21/2019

REVISED -
REVISED -
REVISED -
REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SCALE: NONE SHEET 14 OF 14 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-018R	COOK	565	46
CONTRACT NO. 62A77				
ILLINOIS FED. AID PROJECT				

(Enter Data in Gray Shaded Cells)

Route: I-90/94 Mainline	Comments: Circle Interchange Project Contract 62A76 & 62A77		
Section: 2015-019R			
County: Cook	Design Date: 08/02/2019	ONP	<- BY
Location: Circle Interchange	Modify Date:		<- BY

Facility Type: Interstate or Freeway	# of Lanes = 6 or more	
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Road Class: I		
Rural or Urban ? Urban		
Subgrade Support Rating (SSR): Poor		
Construction Year: 2020		
Design Period (DP) = 20 years		

Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual % of Total ADT
PV =	0	175,057	88.0%
SU =	500	7,957	4.0%
MU =	1500	15,914	8.0%
Struct. Design ADT =	198,929	(2030)	

TRAFFIC FACTOR CALCULATION			
FLEXIBLE PAVEMENT		RIGID PAVEMENT	
Cpv =	0.15	Cpv =	0.15
Csu =	132.5	Csu =	143.81
Cmu =	482.53	Cmu =	696.42
TF flexible (Actual) =	64.67	TF rigid (Actual) =	90.52
TF flexible (Min) =	5.85	TF rigid (Min) =	8.26

(Actual ADT) (Actual ADT)
 (Min ADT Fig. 54-2.C) (Min ADT Fig. 54-2.C)

Full-Depth HMA Pavement

Full-Depth HMA Pavement			JPC Pavement
	Use TF flexible =	64.67	Use TF rigid = 90.52
	PG Grade Lower Binder Lifts = PG 64-22	(Fig. 53-4.R)	Edge Support = Tied Shoulder or C.&G.
Goto Map	HMA Mixture Temp. =	74.5 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. = 11.50 in. (Fig. 54-4.E)
	Design HMA Mixture Modulus (E_{HMA}) =	710 ksi (Fig. 54-5.D)	
	Design HMA Strain (ϵ_{HMA}) =	37 (Fig. 54-5.E)	CRC Pavement
	Full Depth HMA Design Thickness =	16.75 in. (Fig. 54-5.F)	Use TF rigid = 90.52
Goto Map	Limiting Strain Criterion Thickness =	14.75 in. (Fig. 54-5.I)	IBR value = 3
	Use Full-Depth HMA Thickness =	14.75 inches	CRCP Thickness = 12.50 in. (Fig. 54-4.M)

HMA Overlay of Rubblized PCC

HMA Overlay of Rubblized PCC				Unbonded Concrete Overlay	
Goto Map	Use TF flexible =	64.67		Review 54-4.03 for limitations and special considerations.	
	HMA Overlay Design Thickness =	14.75	in. (Fig. 54-5.U)		
	Limiting Strain Criterion Thickness =	10.75	in. (Fig. 54-5.V)		
	Use HMA Overlay Thickness =	10.75	inches	CRCP Thickness =	11.50 inches

Class I Roads 4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	Class II Roads 2 lanes with ADT > 2000 One way Street with ADT <= 3500	Class III Roads 2 Lanes (ADT 750 -2000)	Class IV Roads 2 Lanes (ADT < 750)
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	Min. Str. Design Traffic (Fig 54-2.C)		
Facility Type	PV	SU	MU
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	No Min	No Min	No Min

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Traffic Factor ESAL Coefficients				
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)						
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE I-290 Mainline near Morgan St
SECTION 2013-012R
COUNTY Cook
LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLICY OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

INITIAL COSTS	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680	SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760	TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990	TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196	TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781	TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606	TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166	SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680	SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742	SQ YD	\$10.00 / SQ YD	\$17,420
Note: * Denotes User Supplied Quantity					
FLEXIBLE CONSTRUCTION INITIAL COST					\$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE					\$157,462

MAINTENANCE COSTS:	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)			\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST	\$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE	\$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.8626		PW =	0.8626 X	\$41,700	\$35,971
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWF _n =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.4776		PW =	0.4776 X	\$46,828	\$22,365
	HMA SD						
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWF _n =	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.3554		PW =	0.3554 X	\$41,700	\$14,819
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.3066		PW =	0.3066 X	\$46,828	\$14,355
							\$501,098
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST
45	YEAR LIFE CYCLE	CRF _n = 0.0407852					\$55,056
							MAINTENANCE ANNUAL COST PER MILE

PCC PAVEMENT**JPCP**

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
Worksheet Construction Type is	Reconstruction	8.26	37.44	37.44
		The Pavement Type is		JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680	SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0	SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333	SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742	SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235	TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate Width = 31.0'	17,640	SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680	SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742	SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		\$0.00
HMA POLICY OVERLAY PVMT	(3.75")	1.0043	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	1.0017	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	1.0081	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.8626		PW =	0.8626 X	\$41,700	\$35,971
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00"	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.4776		PW =	0.4776 X	\$46,828	\$22,365
YEAR 30	HMA SD INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75"	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75"	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWFn =	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.3554		PW =	0.3554 X	\$41,700	\$14,819
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.3066		PW =	0.3066 X	\$46,828	\$14,355
							\$501,098
	ROUTINE MAINTENANCE ACTIVITY		2.23 Lane Miles		0.00	\$0	\$0
						MAINTENANCE LIFE-CYCLE COST	\$501,098
45	YEAR LIFE CYCLE	CRFn = 0.0407852				MAINTENANCE ANNUAL COST PER MILE	\$55,056

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

CONSTRUCTION	INITIAL COST		JPCP		HMA
			PRESENT WORTH	\$1,505,528	\$1,433,167
MAINTENANCE	LIFE-CYCLE COST		ANNUAL COST PER MILE	\$165,413	\$157,462
			PRESENT WORTH	\$311,949	\$501,098
TOTAL	LIFE-CYCLE COST		ANNUAL COST PER MILE	\$34,274	\$55,056
			PRESENT WORTH	\$1,817,477	\$1,934,265
			ANNUAL COST PER MILE	\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\I-290 at I-90_94 Ramps_CD Roads-IDOT Mechanistic.xlsm]LifeCycle

(Enter Data in Gray Shaded Cells)

Route: All interchange ramps and C-D Roads		Comments: Circle Interchange Project Contract 62A76 & 62A77	
Section: 2015-019R		Ramp ES/Taylor St. controls design for all ramps per BDE Figure 54-1.B	
County: Cook	Design Date: 08/02/2019	ONP	<-- BY
Location: Circle Interchange	Modify Date:	<-- BY	ADT
			Year
		Current:	43,900 2012
		Future:	43,900 2040

Facility Type: Interstate or Freeway	** Ramp Design Fig. 54-1.B **
# of Lanes = 1 Lane Ramp	Crossroad? Interstate or Freeway
	# of Lanes = 6 or more
	Rural or Urban? Rural

Road Class: 1	Structural Design Traffic
	Minimum ADT
	Actual ADT
	Actual % of Total ADT
	% of ADT in Design Lane
PV = 0	39,510 90.0% P = 100%
SU = 500	1,537 3.5% S = 100%
MU = 1500	2,854 6.5% M = 100%
Struct. Design ADT = 43,900	(2030)

Subgrade Support Rating (SSR): Poor
Construction Year: 2020
Design Period (DP) = 20 years

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT		RAMP DESIGN MIN		RIGID PAVEMENT		RAMP DESIGN MIN	
Cpv = 0.15		0.15	20%	Cpv = 0.15		0.15	20%
Csu = 132.5		132.5	40%	Csu = 143.81		143.81	40%
Cmu = 482.53		482.53	40%	Cmu = 696.42		696.42	40%
TF flexible (Actual) = 31.73	(Actual ADT)	6.32		TF rigid (Actual) = 44.28	(Actual ADT)	8.93	
TF flexible (Min) = 6.32	(Min ADT Fig. 54-2.C)			TF rigid (Min) = 8.93	(Min ADT Fig. 54-2.C)		

Full-Depth HMA Pavement			JPC Pavement		
	Use TF flexible =	31.73		Use TF rigid =	44.28
	PG Grade Lower Binder Lifts =	PG 64-22 (Fig. 53-4.R)		Edge Support =	Tied Shoulder or C.&G.
Goto Map	HMA Mixture Temp. =	74.5 deg. F (Fig. 54-5.C)		Rigid Pavt Thick. =	11.00 in. (Fig. 54-4.E)
	Design HMA Mixture Modulus (E_{HMA}) =	710 ksi (Fig. 54-5.D)			
	Design HMA Strain (ϵ_{HMA}) =	45 (Fig. 54-5.E)			
	Full Depth HMA Design Thickness =	14.75 in. (Fig. 54-5.F)		CRC Pavement	
Goto Map	Limiting Strain Criterion Thickness =	14.75 in. (Fig. 54-5.I)		Use TF rigid =	44.28
	Use Full-Depth HMA Thickness =	14.75 inches		IBR value =	3
				CRCP Thickness =	11.00 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

HMA Overlay of Rubblized PCC		Unbonded Concrete Overlay
Use TF flexible = 31.73		Review 54-4.03 for limitations and special considerations.
HMA Overlay Design Thickness = 12.50 in. (Fig. 54-5.U)		
Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)		
Use HMA Overlay Thickness = 10.75 inches		JPCP Thickness = NA inches
CONTACT BMPR FOR ASSISTANCE		

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)

Facility Type	Min. Str. Design Traffic (Fig 54-2.C)		
	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Number of Lanes	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE
SECTION
COUNTY
LOCATION

I-290 Mainline near Morgan St
2013-012R
Cook
Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH 4 FT
HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLICY OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680 SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760 TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990 TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196 TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781 TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606 TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166 SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")		\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)			\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST \$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE \$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn = 0.8626			PW = 0.8626 X		\$41,700	\$35,971
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn = 0.7441			PW = 0.7441 X		\$46,828	\$34,844
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00"	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn = 0.6419			PW = 0.6419 X		\$278,972	\$179,062
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn = 0.5537			PW = 0.5537 X		\$41,700	\$23,088
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn = 0.4776			PW = 0.4776 X		\$46,828	\$22,365
	HMA SD						
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75"	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75"	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWFn = 0.4120			PW = 0.4120 X		\$428,641	\$176,594
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn = 0.3554			PW = 0.3554 X		\$41,700	\$14,819
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn = 0.3066			PW = 0.3066 X		\$46,828	\$14,355
							\$501,098
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	0.00	\$0	\$0
45	YEAR LIFE CYCLE	CRFn = 0.0407852				MAINTENANCE LIFE-CYCLE COST	\$501,098
						MAINTENANCE ANNUAL COST PER MILE	\$55,056

PCC PAVEMENT**JPCP**

ROUTE 1-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		8.26	37.44	37.44
Worksheet Construction Type is	Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680 SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333 SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742 SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235 TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate Width = 31.0'	17,640 SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		\$7.75
HMA POLICY OVERLAY PVMT	(3.75")		\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWF _n = 0.7441				PW = 0.7441 X	\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWF _n = 0.6419				PW = 0.6419 X	\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWF _n = 0.5537				PW = 0.5537 X	\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWF _n = 0.4776				PW = 0.4776 X	\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWF _n = 0.4120				PW = 0.4120 X	\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWF _n = 0.3554				PW = 0.3554 X	\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWF _n = 0.3066				PW = 0.3066 X	\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
						MAINTENANCE LIFE-CYCLE COST	\$311,949
45	YEAR LIFE CYCLE	CRF _n = 0.0407852				MAINTENANCE ANNUAL COST PER MILE	\$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$1,505,528	\$1,433,167
		ANNUAL COST PER MILE	\$165,413	\$157,462
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$311,949	\$501,098
		ANNUAL COST PER MILE	\$34,274	\$55,056
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$1,817,477	\$1,934,265
		ANNUAL COST PER MILE	\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\I-290 at I-90_94 Ramps_CD Roads-IDOT Mechanistic.xlsm]LifeCycle

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Lake Street Ramps at I-90/94	Comments: Circle Interchange Project Contract 62A76 & 62A77		
Section: 2015-019R	Design Date: 08/02/2019	ONP	<-- BY
County: Cook	Modify Date:		<-- BY
Location: Circle Interchange			ADT
			Year
			Current: 8,200 2012
			Future: 9,000 2040
Facility Type: Interstate or Freeway	** Ramp Design Fig. 54-1.B **		
# of Lanes = 1 Lane Ramp	Crossroad? Unmarked State Route	# of Lanes = 4	Structural Design Traffic
Road Class: I	Minimum ADT	Actual ADT	Actual % of Total ADT
Subgrade Support Rating (SSR): Poor	PV = 0	8,035	92.2%
Construction Year: 2020	SU = 250	331	3.8%
Design Period (DP) = 20 years	MU = 750	349	4.0%
	Struct. Design ADT = 8,714	(2030)	% of ADT in Design Lane
			P = 100%
			S = 100%
			M = 100%

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

Cpv =	0.15	0.15	50%
Csu =	132.5	112.06	50%
Cmu =	482.53	385.44	50%
TF flexible (Actual) =	4.27	(Actual ADT)	3.17
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2.C)	

RIGID PAVEMENT

Cpv =	0.15	0.15	50%
Csu =	143.81	135.78	50%
Cmu =	696.42	567.21	50%
TF rigid (Actual) =	5.83	(Actual ADT)	4.59
TF rigid (Min) =	4.59	(Min ADT Fig. 54-2.C)	

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement		JPC Pavement
Use TF flexible = 4.27	PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Use TF rigid = 5.83
HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)	Design HMA Mixture Modulus (E _{HMA}) = 710 ksi (Fig. 54-5.D)	Edge Support = Tied Shoulder or C.&G.
Design HMA Strain (ε _{HMA}) = 79 (Fig. 54-5.E)	Full Depth HMA Design Thickness = 10.50 in. (Fig. 54-5.F)	Rigid Pavt Thick. = 9.25 in. (Fig. 54-4.E)
Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use Full-Depth HMA Thickness = 10.50 inches	CRC Pavement
		Use TF rigid = 5.83
		IBR value = 3
		CRCP Thickness = 8.25 in. (Fig. 54-4.M)
		TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC		Unbonded Concrete Overlay
Use TF flexible = 4.27	HMA Overlay Design Thickness = 7.75 in. (Fig. 54-5.U)	Review 54-4.03 for limitations and special considerations.
Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Use HMA Overlay Thickness = 7.75 inches	JPCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)
One-way Streets with ADT > 3500			

Facility Type	Min. Str. Design Traffic (Fig 54-2.C)		
	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Number of Lanes	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE

INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH HMA Left 4 FT
 HMA Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
 SHOULDER THICKNESS 8.00 IN Standard Design
 POLYMER OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680 SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760 TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990 TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196 TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781 TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606 TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166 SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	\$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	\$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)			\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST	\$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE	\$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn = 0.8626			PW = 0.8626 X		\$41,700	\$35,971
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn = 0.7441			PW = 0.7441 X		\$46,828	\$34,844
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn = 0.6419			PW = 0.6419 X		\$278,972	\$179,062
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn = 0.5537			PW = 0.5537 X		\$41,700	\$23,088
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn = 0.4776			PW = 0.4776 X		\$46,828	\$22,365
	HMA SD						
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWFn = 0.4120			PW = 0.4120 X		\$428,641	\$176,594
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn = 0.3554			PW = 0.3554 X		\$41,700	\$14,819
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn = 0.3066			PW = 0.3066 X		\$46,828	\$14,355
							\$501,098
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$501,098
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$55,056

PCC PAVEMENT**JPCP**

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
Worksheet Construction Type is	Reconstruction	8.26	37.44	37.44
The Pavement Type is				JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680	SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0	SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333	SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742	SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235	TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate	17,640	SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680	SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742	SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		\$0.00
HMA POLICY OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Top Binder Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Shoulder Mix	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")		\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn = 0.7441			PW = 0.7441 X		\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWFn = 0.6419			PW = 0.6419 X		\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWFn = 0.5537			PW = 0.5537 X		\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWFn = 0.4776			PW = 0.4776 X		\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWFn = 0.4120			PW = 0.4120 X		\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn = 0.3554			PW = 0.3554 X		\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWFn = 0.3066			PW = 0.3066 X		\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE LIFE-CYCLE COST		\$311,949
					MAINTENANCE ANNUAL COST PER MILE		\$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

CONSTRUCTION	INITIAL COST	PRESENT WORTH	JPCP	HMA
			\$1,505,528	\$1,433,167
MAINTENANCE	LIFE-CYCLE COST	ANNUAL COST PER MILE		
		PRESENT WORTH	\$311,949	\$501,098
TOTAL	LIFE-CYCLE COST	ANNUAL COST PER MILE	\$34,274	\$55,056
		PRESENT WORTH	\$1,817,477	\$1,934,265
		ANNUAL COST PER MILE	\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\Lake St Ramp IDOT Mechanistic.xlsm]LifeCycleCost

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Randolph Street Ramps at I-90/94	Comments: Circle Interchange Project Contract 62A76 & 62A77		
Section: 2015-019R	Design Date: 08/02/2019	ONP	<- BY
County: Cook	Modify Date:		<- BY
Location: Circle Interchange			ADT
			Year
			Current: 2,400 2012
			Future: 3,000 2040

Facility Type: Interstate or Freeway

of Lanes = 1 Lane Ramp

Crossroad? Unmarked State Route

of Lanes = 4

Road Class: I

Subgrade Support Rating (SSR): Poor

Construction Year: 2020

Design Period (DP) = 20 years

** Ramp Design Fig. 54-1.B **

	Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane
PV =	0	2,563	92.0%	P = 100%
SU =	250	111	4.0%	S = 100%
MU =	750	111	4.0%	M = 100%
Struct. Design ADT =	2,786	(2030)		

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

RAMP DESIGN MIN		
Cpv =	0.15	50%
Csu =	132.5	50%
Cmu =	482.53	50%
TF flexible (Actual) =	1.38	(Actual ADT) 3.17
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2.C)

RIGID PAVEMENT

RAMP DESIGN MIN		
Cpv =	0.15	50%
Csu =	143.81	50%
Cmu =	696.42	50%
TF rigid (Actual) =	1.88	(Actual ADT) 4.59
TF rigid (Min) =	4.59	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement			JPC Pavement		
Use TF flexible =	3.17		Use TF rigid =	4.59	
PG Grade Lower Binder Lifts =	PG 64-22	(Fig. 53-4.R)	Edge Support =	Tied	Shoulder or C.&G.
HMA Mixture Temp. =	74.5	deg. F (Fig. 54-5.C)	Rigid Pavt Thick. =	9.00	in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA}) =	710	ksi (Fig. 54-5.D)			
Design HMA Strain (ε _{HMA}) =	86	(Fig. 54-5.E)			
Full Depth HMA Design Thickness =	10.00	in. (Fig. 54-5.F)			
Limiting Strain Criterion Thickness =	14.75	in. (Fig. 54-5.I)			
Use Full-Depth HMA Thickness =	10.00	inches			

CRC Pavement		
Use TF rigid =	4.59	
IBR value =	3	
CRCP Thickness =	8.00	in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC			Unbonded Concrete Overlay		
Use TF flexible =	3.17				
HMA Overlay Design Thickness =	7.25	in. (Fig. 54-5.U)			
Limiting Strain Criterion Thickness =	10.75	in. (Fig. 54-5.V)			
Use HMA Overlay Thickness =	7.25	inches			

JPCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)
One-way Streets with ADT > 3500			

Facility Type	Min. Str. Design Traffic (Fig 54-2.C)		
	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Number of Lanes	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2 B)					
	Rural			Urban		
	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE I-290 Mainline near Morgan St
SECTION 2013-012R
COUNTY Cook
LOCATION Circle Interchange

FACILITY TYPE

INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLYMER OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680 SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760 TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990 TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196 TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781 TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606 TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166 SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)			\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST \$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE \$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.8626		PW =	0.8626 X	\$41,700	\$35,971
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.4776		PW =	0.4776 X	\$46,828	\$22,365
	HMA SD						
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWFn =	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.3554		PW =	0.3554 X	\$41,700	\$14,819
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.3066		PW =	0.3066 X	\$46,828	\$14,355
							\$501,098
	ROUTINE MAINTENANCE ACTIVITY						
			2.23	Lane Miles	0.00	\$0	\$0
	MAINTENANCE LIFE-CYCLE COST						
							\$501,098
45	YEAR LIFE CYCLE	CRFn = 0.0407852	MAINTENANCE ANNUAL COST PER MILE				\$55,056

PCC PAVEMENT**JPCP**

ROUTE
SECTION
COUNTY
LOCATION

I-290 Mainline near Morgan St
2013-012R
Cook
Circle Interchange

FACILITY TYPE
INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH PCC Left 4 FT
PCC Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
Worksheet Construction Type is	Reconstruction	8.26	37.44	37.44
				JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680 SQ YD	\$47.42 /SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 /SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333 SQ YD	\$19.00 /SQ YD	\$310,327
PCC SHOULDERS		1,742 SQ YD	\$40.00 /SQ YD	\$69,680
CURB & GUTTER		0 LIN FT	\$30.00 /LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235 TONS	\$25.00 /TON	\$5,875
IMPROVED SUBGRADE:	Aggregate Width = 31.3	17,640 SQ YD	\$7.00 /SQ YD	\$123,480
Reserved For User Supplied Item		0 UNITS	\$0.00 /UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 /UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 /SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 /SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			
			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		
HMA POLICY OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 /SQ YD
HMA SURFACE MIX	(1.50")	Top Binder Mix	\$9.56 /SQ YD
HMA BINDER MIX	(2.25")	Shoulder Mix	\$12.29 /SQ YD
HMA POLICY OVERLAY SHLD	(3.75")		\$15.12 /SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 /SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 /SQ YD
CLASS C SHOULDER PATCHING			\$145.00 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 /SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 /LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 /LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 /LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 /LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn = 0.7441				PW = 0.7441 X	\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWFn = 0.6419				PW = 0.6419 X	\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWFn = 0.5537				PW = 0.5537 X	\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWFn = 0.4776				PW = 0.4776 X	\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWFn = 0.4120				PW = 0.4120 X	\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn = 0.3554				PW = 0.3554 X	\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWFn = 0.3066				PW = 0.3066 X	\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE LIFE-CYCLE COST		\$311,949
					MAINTENANCE ANNUAL COST PER MILE		\$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

CONSTRUCTION	INITIAL COST	PRESENT WORTH	JPCP	HMA
			\$1,505,528	\$1,433,167
MAINTENANCE	LIFE-CYCLE COST	ANNUAL COST PER MILE	\$165,413	\$157,462
		PRESENT WORTH	\$311,949	\$501,098
TOTAL	LIFE-CYCLE COST	ANNUAL COST PER MILE	\$34,274	\$55,056
		PRESENT WORTH	\$1,817,477	\$1,934,265
		ANNUAL COST PER MILE	\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GENIWPDOCS\Pavement Designs\ID-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\ Randolph St Ramp IDOT Mechanistic.xlsm]LifeCycleCost

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Washington Boulevard Ramps at I-90/94

Comments: Circle Interchange Project Contract 62A76 & 62A77

Section: 2015-019R

County: Cook

Location: Circle Interchange

Design Date: 08/02/2019

ONP

<-- BY

<-- BY

	ADT	Year
Current:	3,500	2012
Future:	4,000	2040

Facility Type: Interstate or Freeway

of Lanes = 1 Lane Ramp

** Ramp Design Fig. 54-1.B **

Crossroad? Unmarked State Route

of Lanes = 4

Road Class: I

Subgrade Support Rating (SSR): Poor

Construction Year: 2020

Design Period (DP) = 20 years

	Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane
PV =	0	3,592	94.0%	P = 100%
SU =	250	153	4.0%	S = 100%
MU =	750	76	2.0%	M = 100%
Struct. Design ADT =	3,821	(2030)		

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

	RAMP DESIGN MIN
Cpv = 0.15	0.15
Csu = 132.5	112.06
Cmu = 482.53	385.44
TF flexible (Actual) = 1.15	(Actual ADT) 3.17
TF flexible (Min) = 3.17	(Min ADT Fig. 54-2.C)

RIGID PAVEMENT

	RAMP DESIGN MIN
Cpv = 0.15	0.15
Csu = 143.81	135.78
Cmu = 696.42	567.21
TF rigid (Actual) = 1.51	(Actual ADT) 4.59
TF rigid (Min) = 4.59	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 3.17	
PG Grade Lower Binder Lifts = PG 64-22	(Fig. 53-4.R)
HMA Mixture Temp. = 74.5	deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 710	ksi (Fig. 54-5.D)
Design HMA Strain (ϵ_{HMA}) = 86	(Fig. 54-5.E)
Full Depth HMA Design Thickness = 10.00	in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 14.75	in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness = 10.00	inches

JPC Pavement

Use TF rigid = 4.59	
Edge Support = Tied	Shoulder or C.&G.
Rigid Pavt Thick. = 9.00	in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 4.59	
IBR value = 3	
CRCP Thickness = 8.00	in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible = 3.17	
HMA Overlay Design Thickness = 7.25	in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness = 10.75	in. (Fig. 54-5.V)
Use HMA Overlay Thickness = 7.25	inches

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 - 2000)	2 Lanes (ADT < 750)

	Min. Str. Design Traffic (Fig 54-2.C)		
Facility Type	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE I-290 Mainline near Morgan St
SECTION 2013-012R
COUNTY Cook
LOCATION Circle Interchange

FACILITY TYPE

INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLICY OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

Read Me!

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680 SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760 TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990 TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196 TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781 TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606 TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166 SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	\$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	\$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill Surf)	Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill Surf)	Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill +2.00")	Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill +2.00")	Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL	(100% Rehab = 110.00' / Station / Lane)		\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST	\$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE	\$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.8626		PW =	0.8626 X	\$41,700	\$35,971
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.4776		PW =	0.4776 X	\$46,828	\$22,365
	HMA SD						
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWFn =	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.3554		PW =	0.3554 X	\$41,700	\$14,819
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.3066		PW =	0.3066 X	\$46,828	\$14,355
							\$501,098
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$501,098
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$55,056

PCC PAVEMENT**JPCP**

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
Worksheet Construction Type is	Reconstruction	8.26	37.44	37.44
The Pavement Type is				JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680 SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333 SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742 SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235 TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate Width = 31.0	17,640 SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY \$0.00 / LANE-MILE / YEAR			
HMA POLICY OVERLAY	(3.75")		
HMA POLICY OVERLAY PVMT	(3.75")		\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn = 0.7441			PW = 0.7441 X		\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWFn = 0.6419			PW = 0.6419 X		\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWFn = 0.5537			PW = 0.5537 X		\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWFn = 0.4776			PW = 0.4776 X		\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWFn = 0.4120			PW = 0.4120 X		\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn = 0.3554			PW = 0.3554 X		\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWFn = 0.3066			PW = 0.3066 X		\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE LIFE-CYCLE COST		\$311,949
					MAINTENANCE ANNUAL COST PER MILE		\$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

CONSTRUCTION	INITIAL COST		JPCP	HMA
			PRESENT WORTH	PRESENT WORTH
			\$1,505,528	\$1,433,167
MAINTENANCE	LIFE-CYCLE COST		ANNUAL COST PER MILE	ANNUAL COST PER MILE
			\$165,413	\$157,462
			PRESENT WORTH	PRESENT WORTH
			\$311,949	\$501,098
TOTAL	LIFE-CYCLE COST		ANNUAL COST PER MILE	ANNUAL COST PER MILE
			\$34,274	\$55,056
			PRESENT WORTH	PRESENT WORTH
			\$1,817,477	\$1,934,265
TOTAL	LIFE-CYCLE COST		ANNUAL COST PER MILE	ANNUAL COST PER MILE
			\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\ID-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\Washington Blvd Ramp IDOT Mechanistic.xlsm]LifeCycleCost

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Madison Street Ramps at I-90/94

Comments: Circle Interchange Project Contract 62A76 & 62A77

Section: 2015-019R

County: Cook

Location: Circle Interchange

Design Date: 08/02/2019

ONP

<- BY

Modify Date:

<- BY

ADT

Year

Current:

5,200

2012

Future:

6,000

2040

Facility Type: Interstate or Freeway

** Ramp Design Fig. 54-1.B **

of Lanes = 1 Lane Ramp

Crossroad? Unmarked State Route

of Lanes = 4

Structural Design Traffic

Road Class: I

Subgrade Support Rating (SSR): Poor

Construction Year: 2020

Design Period (DP) = 20 years

	Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane
PV =	0	5,371	94.0%	P = 100%
SU =	250	114	2.0%	S = 100%
MU =	750	229	4.0%	M = 100%
Struct. Design ADT =	5,714		(2030)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

		RAMP DESIGN MIN
Cpv =	0.15	0.15 50%
Csu =	132.5	112.06 50%
Cmu =	482.53	385.44 50%
TF flexible (Actual) =	2.52	(Actual ADT) 3.17
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2.C)

RIGID PAVEMENT

		RAMP DESIGN MIN
Cpv =	0.15	0.15 50%
Csu =	143.81	135.78 50%
Cmu =	696.42	567.21 50%
TF rigid (Actual) =	3.53	(Actual ADT) 4.59
TF rigid (Min) =	4.59	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible =	3.17	
PG Grade Lower Binder Lifts =	PG 64-22	(Fig. 53-4.R)
HMA Mixture Temp. =	74.5	deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E _{HMA}) =	710	ksi (Fig. 54-5.D)
Design HMA Strain (ε _{HMA}) =	86	(Fig. 54-5.E)
Full Depth HMA Design Thickness =	10.00	in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness =	14.75	in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness =	10.00	inches

JPC Pavement

Use TF rigid =	4.59	
Edge Support =	Tied	Shoulder or C.&G.
Rigid Pavt Thick. =	9.00	in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid =	4.59	
IBR value =	3	
CRCP Thickness =	8.00	in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible =	3.17	
HMA Overlay Design Thickness =	7.25	in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness =	10.75	in. (Fig. 54-5.V)
Use HMA Overlay Thickness =	7.25	inches

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)

Facility Type	Min. Str. Design Traffic (Fig 54-2.C)		
	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)

Number of Lanes	Rural			Urban		
	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE I-290 Mainline near Morgan St
SECTION 2013-012R
COUNTY Cook
LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLICY OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680	SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760	TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990	TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196	TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781	TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606	TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166	SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680	SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742	SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)			\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST \$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE \$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.8626		PW =	0.8626 X	\$41,700	\$35,971
YEAR 10	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 15	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWF _n =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 20	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 25	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.4776		PW =	0.4776 X	\$46,828	\$22,365
HMA SD							
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWF _n =	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 35	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.3554		PW =	0.3554 X	\$41,700	\$14,819
YEAR 40	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.3066		PW =	0.3066 X	\$46,828	\$14,355
							\$501,098
ROUTINE MAINTENANCE ACTIVITY				2.23 Lane Miles	0.00	\$0	\$0
45 YEAR LIFE CYCLE				CRF _n = 0.0407852	MAINTENANCE LIFE-CYCLE COST		\$501,098
					MAINTENANCE ANNUAL COST PER MILE		\$55,056

PCC PAVEMENT**JPCP**

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
Worksheet Construction Type is	Reconstruction	8.26	37.44	37.44
			The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680 SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333 SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742 SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235 TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate Width = 31.0	17,640 SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		\$0.00
HMA POLICY OVERLAY PVMT	(3.75")		\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWF _n =	0.7441		PW =	0.7441 X	\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWF _n =	0.6419		PW =	0.6419 X	\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWF _n =	0.5537		PW =	0.5537 X	\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWF _n =	0.4776		PW =	0.4776 X	\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWF _n =	0.4120		PW =	0.4120 X	\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWF _n =	0.3554		PW =	0.3554 X	\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWF _n =	0.3066		PW =	0.3066 X	\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$311,949
45	YEAR LIFE CYCLE	CRF _n = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$1,505,528	\$1,433,167
		ANNUAL COST PER MILE	\$165,413	\$157,462
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$311,949	\$501,098
		ANNUAL COST PER MILE	\$34,274	\$55,056
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$1,817,477	\$1,934,265
		ANNUAL COST PER MILE	\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\ID-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\I-290 (Circle Interchange) IDOT Mechanistic.xlsm]LifeCycleCost

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Adams St. Ramps at I-90/94	Comments: Circle Interchange Project Contract 62A76 & 62A77		
Section: 2015-019R	Design Date: 08/02/2019	ONP	<- BY
County: Cook	Modify Date:		<- BY
Location: Circle Interchange			ADT
			Year
			Current: 4,400
			Future: 5,000
Facility Type: Interstate or Freeway	** Ramp Design Fig. 54-1.B **		
# of Lanes = 1 Lane Ramp	Crossroad?: Unmarked State Route		
	# of Lanes = 4		
Road Class: I	Structural Design Traffic		
Subgrade Support Rating (SSR): Poor	Minimum ADT	Actual ADT	Actual % of Total ADT
Construction Year: 2020	PV = 0	4,499	94.0%
Design Period (DP) = 20 years	SU = 250	191	4.0%
	MU = 750	96	2.0%
	Struct. Design ADT = 4,786	(2030)	
	% of ADT in Design Lane		
	P = 100%		
	S = 100%		
	M = 100%		

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

	RAMP DESIGN MIN
Cpv = 0.15	0.15
Csu = 132.5	112.06
Cmu = 482.53	385.44
TF flexible (Actual) = 1.44	(Actual ADT) 3.17
TF flexible (Min) = 3.17	(Min ADT Fig. 54-2.C)

RIGID PAVEMENT

	RAMP DESIGN MIN
Cpv = 0.15	0.15
Csu = 143.81	135.78
Cmu = 696.42	567.21
TF rigid (Actual) = 1.90	(Actual ADT) 4.59
TF rigid (Min) = 4.59	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 3.17	Use TF rigid = 4.59
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Edge Support = Tied Shoulder or C.&G.
HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA}) = 710 ksi (Fig. 54-5.D)	
Design HMA Strain (ε _{HMA}) = 86 (Fig. 54-5.E)	
Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F)	
Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	
Use Full-Depth HMA Thickness = 10.00 inches	
	CRC Pavement
	Use TF rigid = 4.59
	IBR value = 3
	CRCP Thickness = 8.00 in. (Fig. 54-4.M)
	TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay
Use TF flexible = 3.17	Review 54-4.03 for limitations and special considerations.
HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)	
Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	
Use HMA Overlay Thickness = 7.25 inches	JPCP Thickness = NA inches
	CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more	One way Street with ADT <= 3500	(ADT 750 - 2000)	(ADT < 750)
One-way Streets with ADT > 3500			

Facility Type	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE I-290 Mainline near Morgan St
SECTION 2013-012R
COUNTY Cook
LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLICY OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680 SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760 TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990 TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196 TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781 TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606 TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166 SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill Surf)	Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill Surf)	Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill +2.00")	Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill +2.00")	Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL	(100% Rehab = 110.00' / Station / Lane)		\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST \$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE \$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.8626		PW =	0.8626 X	\$41,700	\$35,971
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.4776		PW =	0.4776 X	\$46,828	\$22,365
	HMA SD						
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWFn =	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.3554		PW =	0.3554 X	\$41,700	\$14,819
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.3066		PW =	0.3066 X	\$46,828	\$14,355
							\$501,098
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	0.00	\$0	\$0
45	YEAR LIFE CYCLE	CRFn = 0.0407852				MAINTENANCE LIFE-CYCLE COST	\$501,098
						MAINTENANCE ANNUAL COST PER MILE	\$55,056

PCC PAVEMENT**JPCP**

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
Worksheet Construction Type is	Reconstruction	8.26	37.44	JPCP
		The Pavement Type is		

INITIAL COSTS				
ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680 SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333 SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742 SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235 TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate Width = 81.0	17,640 SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST \$1,505,528
 RIGID CONSTRUCTION ANNUAL COST PER MILE \$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		\$7.75
HMA POLICY OVERLAY PVMT	(3.75")		\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST \$1,817,477
 RIGID TOTAL ANNUAL COST PER MILE \$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn = 0.7441			PW = 0.7441 X		\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWFn = 0.6419			PW = 0.6419 X		\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWFn = 0.5537			PW = 0.5537 X		\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWFn = 0.4776			PW = 0.4776 X		\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWFn = 0.4120			PW = 0.4120 X		\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn = 0.3554			PW = 0.3554 X		\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWFn = 0.3066			PW = 0.3066 X		\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$311,949
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$1,505,528	\$1,433,167
		ANNUAL COST PER MILE	\$165,413	\$157,462
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$311,949	\$501,098
		ANNUAL COST PER MILE	\$34,274	\$55,056
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$1,817,477	\$1,934,265
		ANNUAL COST PER MILE	\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\D-1\90-94 - at I-290 (Circle Interchange) - 62A76 62A77\Adams St Ramp IDOT Mechanistic.xlsm]LifeCycleCost

(Enter Data in Gray Shaded Cells)

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS			
HMA Overlay of Rubblized PCC			Unbonded Concrete Overlay
Goto Map	Use TF flexible =	3.17	Review 54-4.03 for limitations and special considerations.
	HMA Overlay Design Thickness =	7.25 in. (Fig. 54-5.U)	
	Limiting Strain Criterion Thickness =	10.75 in. (Fig. 54-5.V)	
	Use HMA Overlay Thickness =	7.25 inches	JPCP Thickness = NA inches
CONTACT BMPR FOR ASSISTANCE			

Class I Roads 4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	Class II Roads 2 lanes with ADT > 2000 One way Street with ADT ≤ 3500	Class III Roads 2 Lanes (ADT 750 - 2000)	Class IV Roads 2 Lanes (ADT < 750)
--	--	---	---

	Min. Str. Design Traffic (Fig 54-2.C)		
Facility Type	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE
SECTION
COUNTY
LOCATION

I-290 Mainline near Morgan St
2013-012R
Cook
Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT == > 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLICY OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680	SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760	TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990	TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196	TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781	TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606	TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166	SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680	SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742	SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill Surf)	Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill Surf)	Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill +2.00")	Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill +2.00")	Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL	(100% Rehab = 110.00' / Station / Lane)		\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST \$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE \$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.8626		PW =	0.8626 X	\$41,700	\$35,971
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00"	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.4776		PW =	0.4776 X	\$46,828	\$22,365
HMA SD							
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75"	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75"	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWFn =	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.3554		PW =	0.3554 X	\$41,700	\$14,819
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.3066		PW =	0.3066 X	\$46,828	\$14,355
							\$501,098
ROUTINE MAINTENANCE ACTIVITY				2.23 Lane Miles	0.00	\$0	\$0
45 YEAR LIFE CYCLE				CRFn = 0.0407852	MAINTENANCE LIFE-CYCLE COST		\$501,098
					MAINTENANCE ANNUAL COST PER MILE		\$55,056

PCC PAVEMENT**JPCP**

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		8.26	37.44	37.44
Worksheet Construction Type is	Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680 SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333 SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742 SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235 TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate (WASH # 31.0)	17,640 SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		\$7.75
HMA POLICY OVERLAY PVMT	(3.75")	1.0000	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	1.0000 Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	1.0000 Top Binder Mix	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	1.0000 Shoulder Mix	\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		1.0000 Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		1.0000 Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWF _n =	0.7441		PW =	0.7441 X	\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWF _n =	0.6419		PW =	0.6419 X	\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWF _n =	0.5537		PW =	0.5537 X	\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWF _n =	0.4776		PW =	0.4776 X	\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWF _n =	0.4120		PW =	0.4120 X	\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWF _n =	0.3554		PW =	0.3554 X	\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWF _n =	0.3066		PW =	0.3066 X	\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$311,949
45	YEAR LIFE CYCLE	CRF _n = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

CONSTRUCTION	INITIAL COST		JPCP	HMA
		PRESENT WORTH	\$1,505,528	\$1,433,167
		ANNUAL COST PER MILE	\$165,413	\$157,462
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$311,949	\$501,098
		ANNUAL COST PER MILE	\$34,274	\$55,056
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$1,817,477	\$1,934,265
		ANNUAL COST PER MILE	\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\ID-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\Jackson Blvd Ramp IDOT Mechanistic.xlsm]LifeCycleCost

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Roosevelt Road Ramps at I-90/94	Comments: Circle Interchange Project Contract 62A76 & 62A77		
Section: 2015-019R	Design Date: 08/02/2019	ONP	<-- BY
County: Cook	Modify Date:		<-- BY
Location: Circle Interchange		ADT	Year
		Current: 4,400	2012
		Future: 6,000	2040
Facility Type: Interstate or Freeway	** Ramp Design Fig. 54-1.B **		
# of Lanes = 1 Lane Ramp	Crossroad? Unmarked State Route		
	# of Lanes = 4	Structural Design Traffic	
Road Class: I		Minimum ADT	Actual ADT
Subgrade Support Rating (SSR): Poor			Actual % of Total ADT
Construction Year: 2020			% of ADT in Design Lane
Design Period (DP) = 20 years		PV = 0	P = 100%
		SU = 250	S = 100%
		MU = 750	M = 100%
		Struct. Design ADT = 5,429	(2030)

TRAFFIC FACTOR CALCULATION			
FLEXIBLE PAVEMENT		RAMP DESIGN MIN	
Cpv = 0.15	0.15	50%	
Csu = 132.5	112.06	50%	
Cmu = 482.53	385.44	50%	
TF flexible (Actual) = 2.69	(Actual ADT)	3.17	
TF flexible (Min) = 3.17	(Min ADT Fig. 54-2.C)		

RIGID PAVEMENT		RAMP DESIGN MIN	
Cpv = 0.15	0.15	50%	
Csu = 143.81	135.78	50%	
Cmu = 696.42	567.21	50%	
TF rigid (Actual) = 3.66	(Actual ADT)	4.59	
TF rigid (Min) = 4.59	(Min ADT Fig. 54-2.C)		

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement		JPC Pavement	
Use TF flexible = 3.17	PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Use TF rigid = 4.59	Edge Support = Tied Shoulder or C.&G.
HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)		Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)	
Design HMA Mixture Modulus (E _{HMA}) = 710 ksi (Fig. 54-5.D)			
Design HMA Strain (E _{HMA}) = 86 (Fig. 54-5.E)			
Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F)			
Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)			
Use Full-Depth HMA Thickness = 10.00 inches		CRCP Thickness = 8.00 in. (Fig. 54-4.M)	
		TF MUST BE > 60 FOR CRCP	

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC		Unbonded Concrete Overlay	
Use TF flexible = 3.17	HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)	Review 54-4.03 for limitations and special considerations.	
Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)		JPCP Thickness = NA inches	
Use HMA Overlay Thickness = 7.25 inches		CONTACT BMPR FOR ASSISTANCE	

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class II Roads 4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	Class II Roads 2 lanes with ADT > 2000 One way Street with ADT <= 3500	Class III Roads 2 Lanes (ADT 750 -2000)	Class IV Roads 2 Lanes (ADT < 750)
---	---	--	---

	Min. Str. Design Traffic (Fig 54-2.C)		
Facility Type	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)						
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE I-290 Mainline near Morgan St
SECTION 2013-012R
COUNTY Cook
LOCATION Circle Interchange

FACILITY TYPE

INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLYMER OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA	COST PER TON	UNIT PRICE
HMA SURFACE		\$113.60 / TON
HMA TOP BINDER		\$96.95 / TON
HMA LOWER BINDER		\$65.35 / TON
HMA BINDER (LEVELING)		\$96.95 / TON
HMA SHOULDER		\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680	SQ YD	\$62.63 / SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760	TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990	TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196	TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781	TONS	\$72.00 / TON	\$56,197
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606	TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166	SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680	SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742	SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)			\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST \$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE \$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.8626			PW =	0.8626 X	\$41,700
							\$35,971
YEAR 10	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.7441			PW =	0.7441 X	\$46,828
							\$34,844
YEAR 15	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn =	0.6419			PW =	0.6419 X	\$278,972
							\$179,062
YEAR 20	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.5537			PW =	0.5537 X	\$41,700
							\$23,088
YEAR 25	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.4776			PW =	0.4776 X	\$46,828
							\$22,365
	HMA SD						
YEAR 30	INTERSTATE						
	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWFn =	0.4120			PW =	0.4120 X	\$428,641
							\$176,594
YEAR 35	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.3554			PW =	0.3554 X	\$41,700
							\$14,819
YEAR 40	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.3066			PW =	0.3066 X	\$46,828
							\$14,355
							\$501,098
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$501,098
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$55,056

PCC PAVEMENT**JPCP**

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		8.26	37.44	37.44
Worksheet Construction Type is	Reconstruction	The Pavement Type is		JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680 SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333 SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742 SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235 TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate 1.72" = 31.9	17,640 SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		\$0.00
HMA POLICY OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn = 0.7441			PW = 0.7441 X		\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWFn = 0.6419			PW = 0.6419 X		\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWFn = 0.5537			PW = 0.5537 X		\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWFn = 0.4776			PW = 0.4776 X		\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWFn = 0.4120			PW = 0.4120 X		\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn = 0.3554			PW = 0.3554 X		\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWFn = 0.3066			PW = 0.3066 X		\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$311,949
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

CONSTRUCTION	INITIAL COST		JPCP	HMA
			PRESENT WORTH	PRESENT WORTH
			\$1,505,528	\$1,433,167
MAINTENANCE	LIFE-CYCLE COST		ANNUAL COST PER MILE	ANNUAL COST PER MILE
			PRESENT WORTH	PRESENT WORTH
			\$311,949	\$501,098
			\$34,274	\$55,056
TOTAL	LIFE-CYCLE COST		PRESENT WORTH	PRESENT WORTH
			ANNUAL COST PER MILE	ANNUAL COST PER MILE
			\$1,817,477	\$1,934,265
			\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\1\1-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\{Roosevelt Rd Ramp IDOT Mechanistic.xlsm}LifeCycleCost

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: Taylor Street Ramps at I-90/94		Comments: Circle Interchange Project Contract 62A76 & 62A77																										
Section: 2015-019R																												
County: Cook		Design Date: 08/02/2019 ONP <- BY																										
Location: Circle Interchange		Modify Date: <- BY																										
Facility Type: Interstate or Freeway		<table border="1"> <tr> <td></td> <td>ADT</td> <td>Year</td> </tr> <tr> <td>Current:</td> <td>10,600</td> <td>2012</td> </tr> <tr> <td>Future:</td> <td>11,000</td> <td>2040</td> </tr> </table>			ADT	Year	Current:	10,600	2012	Future:	11,000	2040																
	ADT	Year																										
Current:	10,600	2012																										
Future:	11,000	2040																										
# of Lanes = 1 Lane Ramp		** Ramp Design Fig. 54-1.B **																										
Road Class: I		Crossroad? Unmarked State Route																										
Subgrade Support Rating (SSR): Poor		# of Lanes = 4																										
Construction Year: 2020		Structural Design Traffic																										
Design Period (DP) = 20 years		<table border="1"> <tr> <td></td> <td>Minimum ADT</td> <td>Actual ADT</td> <td>Actual % of Total ADT</td> <td>% of ADT in Design Lane</td> </tr> <tr> <td>PV =</td> <td>0</td> <td>9,880</td> <td>91.0%</td> <td>P = 100%</td> </tr> <tr> <td>SU =</td> <td>250</td> <td>434</td> <td>4.0%</td> <td>S = 100%</td> </tr> <tr> <td>MU =</td> <td>750</td> <td>543</td> <td>5.0%</td> <td>M = 100%</td> </tr> <tr> <td colspan="3">Struct. Design ADT = 10,857</td> <td>(2030)</td> <td></td> </tr> </table>			Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane	PV =	0	9,880	91.0%	P = 100%	SU =	250	434	4.0%	S = 100%	MU =	750	543	5.0%	M = 100%	Struct. Design ADT = 10,857			(2030)	
	Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane																								
PV =	0	9,880	91.0%	P = 100%																								
SU =	250	434	4.0%	S = 100%																								
MU =	750	543	5.0%	M = 100%																								
Struct. Design ADT = 10,857			(2030)																									

TRAFFIC FACTOR CALCULATION			
FLEXIBLE PAVEMENT		RAMP DESIGN MIN	
Cpv =	0.15	0.15	50%
Csu =	132.5	112.06	50%
Cmu =	482.53	385.44	50%
TF flexible (Actual) =	6.42	(Actual ADT)	3.17
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2.C)	

RIGID PAVEMENT		RAMP DESIGN MIN	
Cpv =	0.15	0.15	50%
Csu =	143.81	135.78	50%
Cmu =	696.42	567.21	50%
TF rigid (Actual) =	8.84	(Actual ADT)	4.59
TF rigid (Min) =	4.59	(Min ADT Fig. 54-2.C)	

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement		JPC Pavement	
Use TF flexible = 6.42		Use TF rigid = 8.84	
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)		Edge Support = Tied Shoulder or C.&G.	
HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)		Rigid Pavt Thick. = 9.75 in. (Fig. 54-4.E)	
Design HMA Mixture Modulus (E _{HMA}) = 710 ksi (Fig. 54-5.D)			
Design HMA Strain (ε _{HMA}) = 71 (Fig. 54-5.E)			
Full Depth HMA Design Thickness = 11.25 in. (Fig. 54-5.F)		CRC Pavement	
Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)		Use TF rigid = 8.84	
Use Full-Depth HMA Thickness = 11.25 inches		IBR value = 3	
		CRCP Thickness = 8.75 in. (Fig. 54-4.M)	
TF MUST BE > 60 FOR CRCP			

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC		Unbonded Concrete Overlay	
Use TF flexible = 6.42		Review 54-4.03 for limitations and special considerations.	
HMA Overlay Design Thickness = 8.50 in. (Fig. 54-5.U)			
Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)			
Use HMA Overlay Thickness = 8.50 inches		JPCP Thickness = NA inches	
CONTACT BMPR FOR ASSISTANCE			

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)

Facility Type	Min. Str. Design Traffic (Fig 54-2.C)		
	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)						
Number of Lanes	Rural			Urban		
	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION**FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE I-290 Mainline near Morgan St
SECTION 2013-012R
COUNTY Cook
LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
OF CENTERLINES 5 CL
OF LANES 6 LANES
OF EDGES 2 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH HMA Left 4 FT
HMA Right 4 FT
Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (FLEXIBLE) 14.50 IN 14.75 IN MAX
SHOULDER THICKNESS 8.00 IN Standard Design
POLY OVERLAY THICKNESS 3.75 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		5.85	26.89	26.89

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$113.60 / TON
HMA TOP BINDER	\$96.95 / TON
HMA LOWER BINDER	\$65.35 / TON
HMA BINDER (LEVELING)	\$96.95 / TON
HMA SHOULDER	\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(14.50")	15,680 SQ YD *	\$62.63 / SQ YD	\$982,038 -
HMA SURFACE COURSE	(2.00")	1,760 TONS	\$113.60 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	1,990 TONS	\$96.95 / TON	\$0
HMA LOWER BINDER COURSE	(10.25")	9,196 TONS	\$65.35 / TON	\$0
HMA SHOULDER	(8.00")	781 TONS	\$72.00 / TON	\$56,197 -
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		606 TONS	\$25.00 / TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	18,166 SQ YD	\$7.00 / SQ YD	\$127,162
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	\$1,433,167
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	\$157,462

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$12.75 / SQ YD
HMA OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")	Shoulder Mix	\$7.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$82.72 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$80.86 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)			\$2.00 / LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST	\$1,934,265
FLEXIBLE TOTAL ANNUAL COST PER MILE	\$212,518

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.8626	PW =	0.8626 X	\$41,700	\$35,971	
YEAR 10	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.7441	PW =	0.7441 X	\$46,828	\$34,844	
YEAR 15	MILL PVMT & SHLD 2.00"	100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00"	100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWF _n =	0.6419	PW =	0.6419 X	\$278,972	\$179,062	
YEAR 20	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.5537	PW =	0.5537 X	\$41,700	\$23,088	
YEAR 25	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.4776	PW =	0.4776 X	\$46,828	\$22,365	
HMA SD	INTERSTATE						
YEAR 30	MILL PVMT ONLY 2.00"	100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314	SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17	SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742	SQ YD	\$7.06	\$12,293	
	PWF _n =	0.4120	PW =	0.4120 X	\$428,641	\$176,594	
YEAR 35	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16	SQ YD	\$82.72	\$1,324	
	PWF _n =	0.3554	PW =	0.3554 X	\$41,700	\$14,819	
YEAR 40	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWF _n =	0.3066	PW =	0.3066 X	\$46,828	\$14,355	
						\$501,098	
	ROUTINE MAINTENANCE ACTIVITY		2.23 Lane Miles		0.00	\$0	\$0
						MAINTENANCE LIFE-CYCLE COST	\$501,098
45	YEAR LIFE CYCLE	CRF _n = 0.0407852				MAINTENANCE ANNUAL COST PER MILE	\$55,056

PCC PAVEMENT**JPCP**

ROUTE I-290 Mainline near Morgan St
 SECTION 2013-012R
 COUNTY Cook
 LOCATION Circle Interchange

FACILITY TYPE INTERSTATE

PROJECT LENGTH 1960 FT ==> 0.37 Miles
 # OF CENTERLINES 5 CL
 # OF LANES 6 LANES
 # OF EDGES 2 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH PCC Left 4 FT
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD
 SHOULDER THICKNESS 11.00 IN

POLICY OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		8.26	37.44	37.44
Worksheet Construction Type is	Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	15,680 SQ YD	\$47.42 / SQ YD	\$743,546
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	16,333 SQ YD	\$19.00 / SQ YD	\$310,327
PCC SHOULDERS		1,742 SQ YD	\$40.00 / SQ YD	\$69,680
CURB & GUTTER		0 LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	235 TONS	\$25.00 / TON	\$5,875
IMPROVED SUBGRADE:	Aggregate Width = 31.0	17,640 SQ YD	\$7.00 / SQ YD	\$123,480
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		15,680 SQ YD	\$15.00 / SQ YD	\$235,200
SHOULDER REMOVAL		1,742 SQ YD	\$10.00 / SQ YD	\$17,420

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,505,528
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$165,413

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		
HMA POLICY OVERLAY PVMT	(3.75")	Surface Mix	\$21.85 / SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$9.56 / SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.29 / SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	\$15.12 / SQ YD
CLASS A PAVEMENT PATCHING			\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING			\$150.00 / SQ YD
CLASS C SHOULDER PATCHING			\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$79.54 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$79.54 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL			\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL			\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL			\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)		\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$1,817,477
RIGID TOTAL ANNUAL COST PER MILE	\$199,687

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

08/26/19

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn = 0.7441			PW = 0.7441 X		\$2,400	\$1,786
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWFn = 0.6419			PW = 0.6419 X		\$4,650	\$2,985
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWFn = 0.5537			PW = 0.5537 X		\$75,845	\$41,994
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWFn = 0.4776			PW = 0.4776 X		\$72,965	\$34,848
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%	26	SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	15,680	SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12	\$26,342	
	PWFn = 0.4120			PW = 0.4120 X		\$466,753	\$192,296
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn = 0.3554			PW = 0.3554 X		\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	5,659	LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWFn = 0.3066			PW = 0.3066 X		\$68,422	\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$311,949
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$34,274

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/23/14 8:02 AM

CONSTRUCTION	INITIAL COST		JPCP	HMA
			PRESENT WORTH	PRESENT WORTH
			\$1,505,528	\$1,433,167
MAINTENANCE	LIFE-CYCLE COST		ANNUAL COST PER MILE	ANNUAL COST PER MILE
			PRESENT WORTH	PRESENT WORTH
			\$311,949	\$501,098
			\$34,274	\$55,056
TOTAL	LIFE-CYCLE COST		PRESENT WORTH	PRESENT WORTH
			ANNUAL COST PER MILE	ANNUAL COST PER MILE
			\$1,817,477	\$1,934,265
			\$199,687	\$212,518

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\Taylor St Ramp IDOT Mechanistic.xlsm]LifeCycleCost